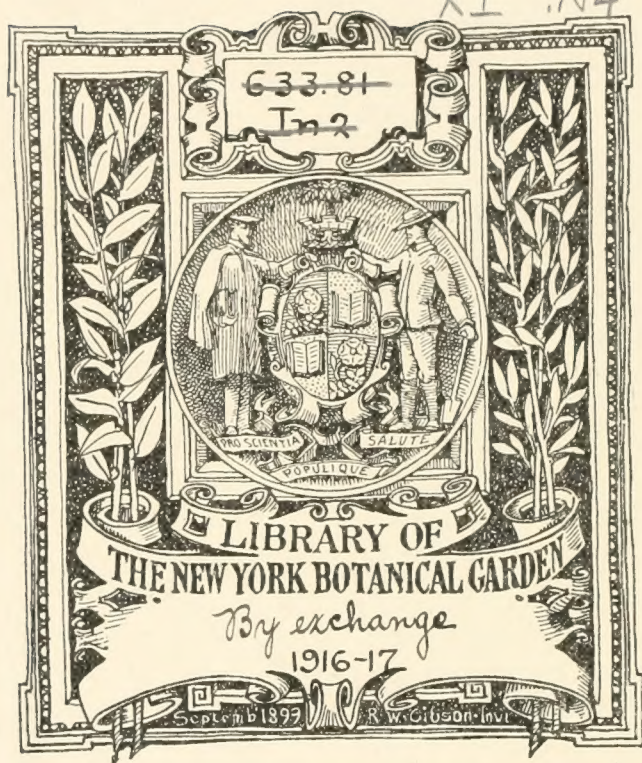


XI .N4



The India Rubber World

VOLUME LV

October, 1916, to March, 1917

VOLUME LVI

April, 1917, to September, 1917

New York:

THE INDIA RUBBER WORLD PUBLISHING CO.

1917

Vol. LVII

OCTOBER 1, 1917

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Edited by HENRY C. PEARSON—Offices, No. 25 West 45th Street, NEW YORK.

Vol. LV. No. 1.

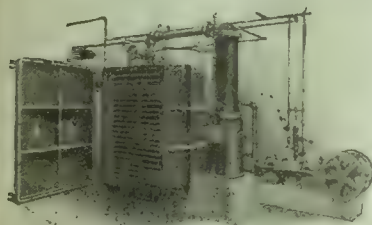
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Published on the 1st of each month by

THE INDIA RUBBER PUBLISHING CO.

No. 25 West 45th Street, New York.

Telephone—Bryant 2576.

CABLE ADDRESS: IRWORLD, NEW YORK.

HENRY C. PEARSON, Editor

Vol. 55

OCTOBER 1, 1916

No. 1

SUBSCRIPTIONS \$3.00 per year, \$1.75 for six months, postpaid, for the United States and dependencies and Mexico. To the Dominion of Canada and all other countries, \$3.50 (or equivalent funds) per year, postpaid.

ADVERTISING: Rates will be made known on application.

REMITTANCES. Should always be made by bank draft or Postoffice or Express money order on New York, payable to THE INDIA RUBBER PUBLISHING COMPANY. Remittances for foreign subscriptions should be sent by International Postal Order, payable as above.

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Entered at the New York postoffice as mail matter of the second class.

TABLE OF CONTENTS ON LAST PAGE OF READING.**A PENSION PLAN FOR MUTUAL BENEFIT.**

A **NOTHER** large firm has adopted the pension system in the belief that it will benefit both employer and employe. Realizing that the certainty of a competence in old age offers a great incentive to faithful and efficient work and also tends to minimize unrest and discontent, the Crompton & Knowles Loom Works, of Worcester, Massachusetts, and Providence, Rhode Island, which supplies equipment for rubber manufacturers, has instituted a liberal, retroactive plan to reward upon retirement those of its 2,600 operatives who have grown old in the firm's employ. The scheme is based proportionately upon the length of service and the average monthly wages. An employe whose earnings have averaged \$60 monthly for 25 years prior to his retirement will receive annually the minimum pension, a sum equal to the income from \$4,500 at the usual 4 per cent savings bank rate of interest, the principal obviously being equivalent to yearly savings of \$180 for the 25 years. On this basis a man with a record of 25 years' service will receive \$180 annually; 30 years' \$216; 35 years, \$252;

40 years', \$288. When the average wages have been greater than \$60 monthly the pension principal will be increased proportionately. For example, average earnings of \$90 monthly for a period of 40 years will increase the principal to \$10,800 and the pension to \$432 annually; in other words, the retired employe will derive the benefit corresponding to the income from accumulated yearly savings of \$270 for the entire 40 years.

In its announcement the firm emphasizes particularly the advantages of long service on the part of its operatives by reminding them that many large employers will hire absolutely nobody over 45 years of age, however skilled, for a permanent position; also that as a physical examination is frequently required it will become increasingly difficult to procure employment in new situations beyond that period of life. The net result of the plan will doubtless be to retain the most valuable operatives and to cause them of their own volition to seek retirement when incapacitated for further efficient service.

RUBBER PROSPECTS IN FRENCH INDO-CHINA.

THE growing importance of plantation rubber in French Indo-China has led us to publish in full the informing report of Lawrence P. Briggs, the American Consul at Saigon. Beginning with a product of 55 tons in 1909 it increased to 297 tons in 1915. For the present year, however, the increase is far more rapid. The first quarter of 1916 shows a product of 257 tons, or nearly as much as was exported in the whole of 1915. And that this growth is to continue is shown by the conservative estimate of O. Berguet, president in charge of the Association of Rubber Planters of French Indo-China, which is 4,000 tons in 1920. The product will doubtless far exceed this, for rubber growing has been found so profitable and the colony is so well represented by the Planters' Association, that much French, and no doubt American, capital is sure to be attracted to further *Hevea* planting in French Indo-China.

"IT SHINES FOR ALL" BUT THE RUBBER MEN.

THE uniformly sage, sane and sensible "Sun," New York, dropped a stitch in its news fabric September 8, when it published an article entitled "Artificial Rubber," etc. It was readable,—indeed, to the uninitiated, plausible,—and is being copied by other newspapers, but its inaccuracies were so glaring that we cannot forbear from gentle criticism.

For example, the writer says:

At the beginning of the war the European Governments

discovered, what indeed was generally foreseen, that they would have to obtain the bulk of their rubber, raw and vulcanized, from the United States.

Read the "Central Powers" instead of "European Governments" and this would pass. The other powers depend upon England for their rubber.

Speaking of French rubber reclaiming, the writer avers:

Washing with steam is the method usually adopted, which drives off the sulphur in fumes and melts the rubber without burning it.

"Washing with steam" is bad enough but "*melting*"! Melted rubber is a sticky, tarry, offensive mess that always remains sticky, tarry and offensive. Melting never has been, and never will be, a part of any rubber manufacturing process.

Continuing, he says:

The one thing which this peculiar art of making old rubber feel and look like new requires is to restore the elasticity and compressibility of the original rubber, but this unfortunately it fails to do.

Compressibility? Is rubber, then compressible? Or water? We thought not.

Solemnly he states, a line or two further along:

They are now making rubber from gelatine.

Of course, and of course, they are emphatically *not*. Further on he iterates:

It is stated that the rubber which remains behind can be vulcanized so successfully that the final product has all the properties, elastic and compressible, of the best Para rubber. Compressible again after what we said above! Our temper is going fast.

And as a final insult to anyone's intelligence, this melter and compressor of rubber, cites the old glue and glycerin formula, the gas tubing cover, the tire filler compound. Artificial rubber? And in the "Sun"!

THE COST OF WET RUBBER.

FOR the fiscal year ending June 30, 1916, the United States imports of plantation rubber were over 90,000 tons. The shrinkage on this amount may be reckoned at two per cent, or 1,800 tons. The same quantity of wild rubber; figuring a 20 per cent shrinkage, would lose 18,000 tons.

Freight rates from the Far East for 1915 may be reckoned at 2½ cents per pound, or \$56 a ton. Therefore, manufacturers paid somewhere in the neighborhood of \$100,800 on freight alone, on the water contained in that plantation rubber.

But had this been wild rubber with a shrinkage of 20 per cent, the contained water would have cost the importers \$1,008,000 for freight, besides an extra amount for insurance, etc., not reckoned herein.

This, however, is not all the saving. It is estimated that it costs one-half cent per pound to wash and dry wild rubber, or \$11.20 per ton, and to wash 90,000 tons would

cost another exactly equal amount, namely, \$1,008,000. In other words, the year's consumption of plantation rubber was cheaper by over \$2,000,000 than would have been an equal amount of wild rubber.

This is why wild rubber, if it is to compete, should come to the market clean, and with a greatly limited shrinkage.

A LATIN-AMERICAN VIEWPOINT.

A SOUTH AMERICAN importer was asked why he always bought European-made tires and refused to handle the American product. For reply he brought out a circular of a well-known American-made tire and pointed to the statement, "We make 5,000 tires a day." He then produced a circular of a European-made tire that claimed, "In our factory 500 tires are made every day." Shrugging his shoulders, he said: "Five thousand tires a day means haste and carelessness. Five hundred a day, care and finish. That is why."

THE NATIONAL RETAIL DRY GOODS' ASSOCIATION is advocating the passage of an "Anti-return Goods Law." If the return of goods could be regulated equitably for both buyer and seller it would be of inestimable value, particularly to the makers of the goods. The rubber trade is a great sufferer through unfair claims, adjustments and returns. Why should not the alert and enterprising Rubber Club of America, Inc., force reforms in this field?

"KEDS" IS THE NEW NAME FOR TENNIS SHOES TO BE used hereafter by all who make or handle the footwear of the United States Rubber Co. As a bit of word coinage it is clever and original and will go far toward killing the popular but objectionable term "Sneakers."

A RUBBER HEEL EXPERT ESTIMATES THAT THE AVERAGE man takes 8,000 steps a day. An engineering authority reckons that a 180-pound man raises his feet two inches (or more) from the ground in walking, and that the impact of his heel is 30 foot-pounds each step. Now, the average rubber heel lasts three months. Eight thousand steps a day means 720,000 steps in ninety days. The mechanical engineer thus deduces that the total impact, or shock of three months' walking would be 21,600,000 foot-pounds. What, besides rubber, would withstand such constant pounding? Wood would be battered to pieces; stone reduced to impalpable powder; iron flattened out to a thin disk; gold beaten so thin as to be almost transparent. Rubber outwears them all, and that is the cause of its marvelously increasing use for heels the world over.

Plantation Rubber in Cochin China—II.

By Lawrence P. Briggs, United States Consul at Saigon, French Indo-China.

GETTING POSSESSION OF THE LAND.

AFTER deciding on a location, the next step is to get possession of the land. Theoretically, the government of Indo-China permits the acquisition of domain lands by gift or by auction sale under certain conditions of cultivation.

Free concessions apply only to tracts of 50 hectares or less. Application must be made on stamped paper to the administrator-in-chief of the province in which the land is located, indicating clearly the location of the land, its approximate extent and boundaries, and enclosing a rough sketch of the tract. In the case of tracts exceeding 10 hectares, the application must also be accompanied by the fee for the administrative inquiry, which fee is uniformly 20 cents (about 10 cents United States currency) per hectare. The application is then registered and a receipt signed by the administrator is returned to the applicant. Then for two months the administration posts notices of application (1) on the land, whose boundaries should be marked by the applicant; (2) at the town hall of the village where the land is located, and (3) on the door of the office of the administrator of the province. At the end of the two months the application is delivered, together with the report of the native authorities and the protests of third parties, if any, to a special investigating committee composed of the following officials: the administrator-in-chief of the province, president; the chief, or under-chief of the canton, and two notables of the village. If the land is located in a forest region, an agent of the Forestry Service is added to this committee. The applicant, the owners of the adjoining property and the occupants of the tract, if any, are duly summoned and sign the official report (process-verbal), formulating in it all observations and reservations which they consider necessary. When informed by the administrator of the conclusions of the committee the applicant, if he accepts, deposits with the administrator a map of the land and an official report of its location and delimitation. These reports and documents are sent to the governor of the colony, who, if he approves, will put the applicant in possession of the land. The applicant must establish his domicile on the plantation, or at the seat of the province, and must put the concession under cultivation, within three years in the case of concession of 10 hectares or less and within five years in the case of 10 to 50 hectares, under the penalty of forfeiture of all or part of the land granted. If at the end of this period all the

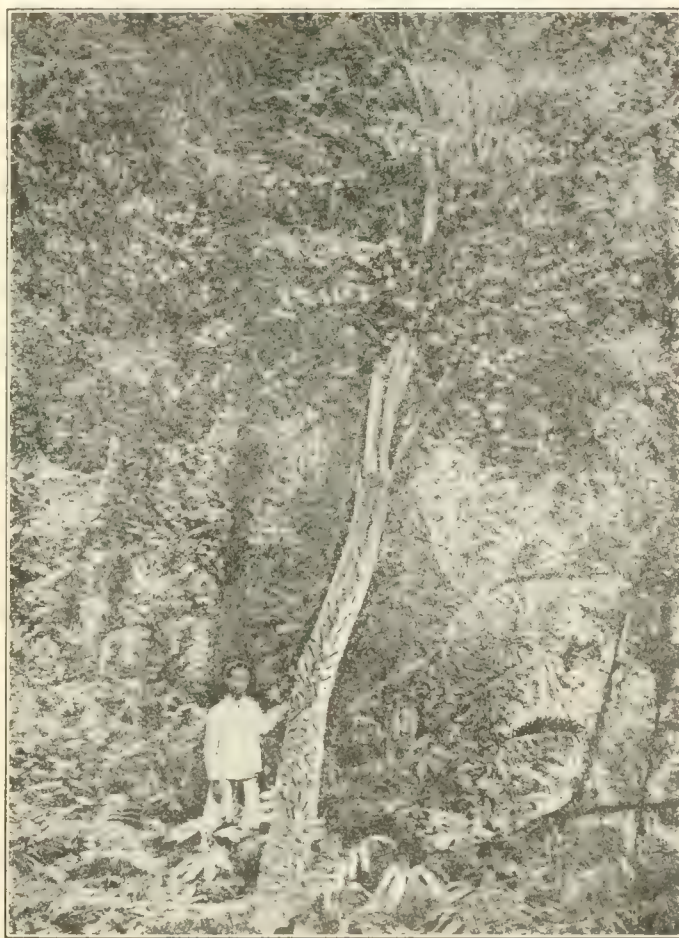
conditions have been complied with, the holder of the concession is granted a definite title to his land.

In actual practice, however, no rubber estates of any consequence are ever granted gratuitously in French Indo-China. In the case of tracts of more than 50 hectares the land is sold at public auction. Application is made in the same way as for a free grant, and the notice is the same, except that it must also be published for two months in the "Bulletin Administratif" of the colony and the "Moniteur des Provinces." A similar committee meets and fixes the price of the land and other costs. The applicant may establish his residence

at the capital of the protectorate instead of either of the places mentioned in the preceding paragraph, and the reports and specifications (*cahiers des charges*) must be approved by the governor in council. After approval notice must be given, from 15 days to a month in advance of the sale, by placards printed in French and in the native language of the district, naming the day, hour and place of the sale. These placards must be posted (1) on the door of the office of the administrator of the province, (2) at the town hall of the village, (3) at the town halls of neighboring villages and (4) in the government offices at Saigon. Notice must also be published in the "Bulletin Administratif" and the "Moniteur des Provinces." All persons wishing to bid on this land must deposit a sum equal to one-fourth of the minimum price when this amount exceeds 100 piastres, which sum will be returned to all except the successful bidder. All terms, conditions and reservations are fixed by the specifications (*cahiers des charges*) signed by the investigating committee and by the applicant or someone holding his power

of attorney. The purchase price is paid by the successful bidder in two instalments—one within 20 days of the sale, the other a year later. Upon the fulfilment of all the conditions of the *cahiers des charges* a definite title is granted by a special decree of the governor in council. The price paid in the past for rubber lands sold at public auction has varied from 50 cents to 5 piastres per hectare.

In the case of rubber lands, all grants, whether by free title or



*Blackroden, an indigenous rubber tree in French Indo-China over-tapped by natives.**

*The *Blackroden* (a species of *Hevea*) grows in Indo-China, if properly tapped, yields a quickly coagulating latex. The caoutchouc, when separated from impurities, is pronounced of excellent quality, and has sold at 70 to 80 per cent of current prices for fine Para. The natives hack the trees so ruthlessly as to prevent proper flow of the latex, and frequently to such extent as to endanger the life of the trees.

the grant is made under certain conditions of cultivation. In all grants up to 500 hectares, one-tenth of the grant must be planted each year with at least 120 rubber trees per hectare, so that half the grant is under rubber cultivation at the end of five years, under the penalty of forfeiture of all or part of the estate. This time is extended to ten years in the case of grants exceeding 500 hectares. For the remainder of the concession the holder may leave it in waste land or pasturage or plant it to rice or other cultures. But a definite title will not be granted until half the plantation is under cultivation. An administrative committee visits each grant in November of each year to see that all these terms are complied with.

For the first seven years a rubber grant is exempt from land tax. At the beginning of the eighth year one-tenth of the estate is subject to the impost levied on the first class of "various cultures" (275 piastres per hectare), and the uncultivated half is subject to the impost on the third class of various cultures (48 cents per hectare). After the tenth year one-half of the estate is subject to the first-class tax, the other half to the third-class tax.

All these terms and conditions are applicable to foreigners under the same conditions as to French citizens or colonists.

Rubber lands, planted or unplanted, may also be purchased of private individuals from time to time. During the past year several small plantations were offered for sale. The foreigner should be wary about purchasing a small estate, for rubber production in the past has been largely an experiment, and there has been some reckless tapping, especially on the smaller plantations. The larger estates are generally held by joint-stock companies. Their shares are sometimes offered for sale by the notaries of Saigon through the columns of the local papers and especially those of the "Bulletin Financier de l'Indochine." At present it is practically impossible to purchase stock in the better plantations.

A few cases may serve to illustrate the prices at which these plantations have been sold or offered for sale during the past year. The most important deal in rubber plantation property since the beginning of the European war was the sale in May, 1915, of the plantation of Tan-thanh-dong. One of the leading stockholders of this firm was a German; so the firm was dissolved and the property sold. The amount received was 225,000 piastres. This was considered a very low price; but the sale took place before the phenomenal rise in the price of rubber and under conditions which may have restricted the number of bidders and limited the amounts offered. In November, 1915, a small plantation near Saigon was offered for about 30,000 piastres. This plantation consisted of 450 hectares, of which 150 hectares were planted with 50,000 trees a little more than five years old and ready to be tapped, a nursery containing more than 150,000 young trees and some timber and buildings. While these cases may have some significance, they do not indicate the prices at which the best rubber plantations are now held.

CLEARING AND PLANTING.

Some of the older plantations were located on cultivable or prairie land; but in the red soil region the clearing of the plantation is a more serious problem. The vegetation is tropical and dense, and the stumps and roots must be removed or in the moist, hot season they will furnish a hotbed for mold and other plant diseases. In spite of the cheapness of native hand labor (10 to 20 cents per day), the clearing of a plantation sometimes costs as much as 25 piastres per hectare [over \$5 per acre]. However, the vegetation is less dense, the rainfall less constant and the cost of clearing less expensive than in the more tropical climate of neighboring rubber producing countries.

Before the plantation is ready, a small tract of land is prepared as a nursery. Here the seeds are planted, generally toward the end of the rainy season (September to January). The young

plants are sheltered from the sun during the dry season and at the beginning of the rainy season (May or June) they have attained a height of 1.50 to 1.80 meters [5 to 6 feet] and are ready to be transplanted. Holes are dug 80 centimeters to 1 meter [32 to 40 inches] in depth and wide enough to accommodate all the roots. On the earlier small plantations the trees were planted very close together. The larger plantations—Xatrach and Suzannah—at first adopted $4\frac{1}{2}$ by 5 meters; but this distance was found too small, and the later plantations have generally been spaced 6 or 7 meters between trees.

CARE OF THE PLANTATION DURING THE CULTIVATION PERIOD.

The question of drainage is sometimes an important one in Cochin China; for the whole delta region is subject to inundations from July to November, while in some parts of Cochin China the rainfall from May to October, inclusive, averages over 20 inches per month, and during some months it is sometimes as great as 30 inches. Up to the present time no precautions have been found necessary against the invasion of the waters of the Mekong and other waters coming from lower levels, and it is unlikely that any such precautions will ever be necessary, because most of the good rubber lands are somewhat higher than the flooded delta district. But it has been found necessary on nearly all these plantations to provide ditches and sometimes large reservoirs for the drainage of excessive rainfall or the overflow of neighboring streams during the long, wet season.

The soil between the trees is kept soft by plowing and kept clean by constant weeding. The larger plantations have steam plows of 60 to 100 horse-power but the smaller ones use native wooden plows or ordinary American steel plows drawn by native cattle or *carabao*. The weeding is generally done by hand.

The dryness of the months from November to April, and especially from January to March, makes irrigation necessary on nearly all the rubber plantations of Cochin China. The rainfall during these months averages as low as 2 inches per month. Sometimes there are months with no rain, but this is not common; and the uniformly cool nights during this season combined with the always humid tropical atmosphere provide a little moisture by condensation. Water can often be stored during the rainy season. At any rate, streams are abundant and underground veins are everywhere near the surface. Ditches and reservoirs, useful for both drainage and irrigation, are found on practically all the rubber plantations. A few of the smaller plantations employ stationary hand-pumps or movable double-balance, two-cylinder, suction drainage pumps of 4,000 or 5,000 gallons capacity per hour. On the larger plantations the type of pump most in use is a mounted centrifugal, gas or petroleum motor-pump of 10,000 to 50,000 gallons per hour. The type and make of pump used varies with conditions, but Worthington pumps of various styles find a comparatively good sale.

Up to the present time the use of fertilizer has been very small and practically confined to some of the older gray soil plantations and the nurseries. The substances used have been stable manure, oil cake, malt, azote, potash, phosphates and superphosphates. On the red soil plantations nothing but stable manure has been used. The larger plantations have small herds of cattle and employ the manure in the nursery and around the roots of the young trees. The time will undoubtedly come when the use of a small amount of fertilizer will be necessary to supply the lacking soil constituents discussed in a previous paragraph of this report.

TREE ENEMIES AND DISEASES: NEW PLANTS AND SEEDS.

As has been stated in a preceding paragraph, the principal enemies of the rubber tree in Indo-China are water, drought and typhoons. This region seems to be singularly free of rubber diseases. The long, dry season has its drawbacks, but it seems to insure the trees against mold and similar maladies common to other rubber regions of the more tropical Orient. There has

never been even a slight epidemic of any kind in the rubber region of Indo-China.

At first seeds and even plants were imported into Cochin China from Ceylon, Singapore and Java; but the presence of cryptogamic diseases in the rubber trees of these districts, led to a decree in 1910 prohibiting the importation of *Hevea* plants into Indo-China and providing for the disinfection of imported seeds. Since that time new plantations have generally purchased their initial plants or seeds of the Belland, Ong-Yem and other earlier plantations.

SECONDARY CULTURES. USE OF MACHINERY.

Secondary cultures do not yet form an important element in the rubber plantations of Cochin China. A little rice and sometimes maize is raised for the employes and the stock, and a certain amount of land is devoted to pasturage. The amount of land given over to these purposes will necessarily increase when land is worn and the need for fertilization with stable manure or by turning under a crop becomes more pressing. Cocoanuts and other native fruits are often raised, especially on the small native plantations. The Locninh plantation has about 300,000 coffee plants, the Xa-cam plantation about 115,000, the Delignon plantations in Annam about 125,000, and other plantations a smaller number, making in all about 550,000 coffee plants. A small plantation in Cochin China has about 11,000 cashew trees, one in Annam about 10,000 kapok plants and another raises annually several hectares of Soya beans.

The cultivation of these secondary cultures in connection with that of rubber demands a variety of agricultural implements. The smaller plantations use native hand-made plows, harrows, hoes, spades, etc., but the larger plantations use modern machinery, such as traction plows, harrows, rollers, trucks and mowing machines. The motive power is sometimes native cattle and *carabao* and sometimes steam. With the development of this industry, both intensively and extensively, there will come a greater demand for agricultural machinery.

Agricultural machinery is sometimes purchased in France by the Paris representative of the plantation, but it is generally bought of local importers. In either case it is imported from France, although much of the machinery is of American origin. The leading Saigon importers and dealers are Descours, Cabaud et Cie, Graf, Jacque et Cie, and Bonnefoy Freres. The directors of these firms are also directors of large rubber estates in Cochin China.

TAPPING AND GATHERING.

The rubber trees of the gray soil plantations are generally tapped at the age of five or six years. By this time they have attained a height of 15 or 20 feet and a circumference of about 18 inches. On some of the red soil plantations the trees reach this size during the fourth year and are tapped at this age. The half-herringbone method is almost universally employed. The trunk is usually divided into fifths and two of these parts tapped at once over an up-and-down extent of about 20 or 30 inches per year. The tapping is generally done every day—except during the months of January and February—the middle of the dry season, when the trees are given a rest.

The table given below shows the volume in cubic centimeters of latex produced each month by groups of selected trees on the experimental station at Ong-Yem during 1910:

Month.	1 Trees.	4 Trees.	42 Trees.
January	1,717	895	Not tapped
February	1,381	4,158	Not tapped
March	1,226	9,841	3,865
April	1,746	8,966	15,425
May	1,557	9,034	15,110
June	5,595	9,720	14,138
July	4,795	7,680	11,585
August	7,194	11,073	12,336

Month.	1 Tree.	4 Trees.	42 Trees.
September	7,63	1,212	587
October	7,68	1,264	1,197
November	7,78	1,264	892
December	7,430	1,264	1,062

Experiments made at the same time show that the weight per cubic centimeter of the latex is a little greater during the season of heavy production but that it contains a smaller percentage of rubber than during the dry season. The density of this latex varied from .88 to .98 grams per cubic centimeter, the amount of dry rubber produced per gram of latex varied from .30 to .72 grams. Making due allowance for unusual conditions, these tables give a fair composite picture of the relative productivity of the different seasons of the year.

The latex is gathered daily. A native can tap from 300 to 400 trees a day and gather latex from about an equal number. At the Suzannah plantation, where native labor is very efficient, the director hopes to bring this amount up to 600 trees per man and 450 trees per woman. Since the beginning of rubber cultivation in Cochin China the average annual rubber production per tree has been about three-quarters of a kilo; but the old Belland plantation claims an average of 2½ kilos for 1915, and some portions of the newer plantations are said to average over a kilo per tree. As the above tables will show, selected groups of trees at Ong-Yem have produced over 5 kilos each per year. In considering these figures it must be borne in mind that up to the present time most of the trees tapped each year are new and that the trees have been planted too close together to obtain the best results.

METHOD OF PREPARATION.

The methods of preparation vary slightly on the different plantations. The first step is to strain the latex. To prevent the too rapid coagulation a little water is sometimes placed in the receptacles in which it is collected. The latex is strained through a fine sieve, which collects all the leaves and other impurities, and is then placed in porcelain-lined basins about 8 by 12 inches and 3 or 4 inches deep and allowed to coagulate. Sometimes a solution of acetic acid is added to assist the coagulation.

The coagulated mass is then passed several times through one or more sets of rollers until it is pressed into thin sheets. Some plantations have a heavy set of smooth rollers which merely press the rubber into sheets and smaller rollers which impress a design upon them. The rollers are generally of steel or zinc. One of the leading plantations has employed copper rollers, but is considering a change due to the objections of prospective purchasers of the product. When finished the sheets are about 11 or 12 inches wide, 20 to 24 inches long and ⅛ to ¼ inch in thickness. These sheets are then taken to the drying room.

The strainings of the latex, the lumps found on straining, the water left in the cups, basins and other receptacles and the foam and other skimmings after straining are prepared into various grades of rubber and "scraps."

The rubber is sometimes dried by natural air in a closed room, sometimes dried with hot air and sometimes simply exposed in a dry place to the tropical atmosphere. The first of these methods is followed at Xatrach, the second at Suzannah and the third at the Belland plantations and in general at all the smaller plantations. The Suzannah plantation has a \$14,000 drying plant, consisting of an "Ouragan" mechanical drier operated by a 75 horsepower motor. The rubber produced on this plantation is ready for market within ten or twelve days after leaving the tree, while on other plantations of Cochin China the preparation of the rubber requires from twenty to thirty days, according to the season. Some plantations smoke the sheet rubber in the closed room by conducting wood-smoke into the room through a pipe; others by the addition of a little creosote to the latex.

(To be continued.)

The Chemical Convention and Exposition.

THE fifty-third annual meeting of the American Chemical Society was held in New York City the last week of September, and in point of attendance and interest far exceeded any previous meeting. More than 2,000 members registered at the Chemists' Club during the week. Meetings were held on the first five days of the week, some of them being at Columbia University, others at the Chemists' Club, the New York College of Pharmacy, and the Grand Central Palace. At this latter building was held during the week the Second National Exposition of Chemical Industries, 200 firms and companies making exhibits.

During the forenoon of Monday, at the Chemists' Club, a committee was busy registering the names of visiting members, a large number of whom were accompanied by their wives. To each was presented a badge which was an open sesame to most of the functions on the program. At this club, rooms were set apart for visiting ladies, a large committee of ladies having charge of this portion of the program. Here also the reception rooms and the large dining room were thrown open to members and visitors, while the chairmen of the various committees were on hand to fulfil the duties assigned to them.

The formal opening of the exposition was held at the Grand Central Palace on Monday afternoon, the opening address being by President Charles H. Herty, and other speeches by Dr. Francis A. J. Fitzgerald and Dr. Arthur B. Daniels.

On Tuesday, at the general meeting of the society at Horace Mann Auditorium, Columbia University, J. Merritt Mathews, president of the New York section of the American Chemical Society, presided, and addresses of welcome were made by Dr. Haven Emerson, Health Commissioner of the City of New York, and President Butler, of Columbia University.

In accordance with the general program the various divisions held meetings at which papers were read pertaining to that special portion of the industry to which the division was devoted. Among the papers read in other divisions than the Rubber Section which would be of interest to the readers of this journal, and which, therefore, may be accorded attention in the coming number, are: "Showerproofing," by E. L. Mack; "Vulcanization of Rubber," by D. Spence; "Aniline and Other Coal Tar Products," by George P. Adamson, and "Bureau of Mines Studies on Occupational Diseases," by Dr. W. A. Lynott, Washington, D. C.

The evenings were set apart mainly for social functions. On Tuesday a reception was held at the Hotel Astor, where members, guests, and members of the American Electrochemical Society and Technical Association of Pulp and Paper Industry were present. On Wednesday evening the Electrochemical Society held a smoker, members of the American Chemical Society being their guests. Thursday evening a grand banquet was held at the Waldorf-Astoria. Friday afternoon and evening were devoted to visiting the exposition at the Grand Central Palace. Meanwhile a special program was laid out for the visiting ladies, this being in charge of an able and efficient committee.

Taken altogether, the convention was most assuredly the best in the history of the society. In the completeness of arrangement, great credit is due to the officers and committees having the details in charge, including President Charles H. Herty, Secretary Charles L. Parsons, the chairmen of the various meetings; Carl L. Alsberg, Edward Bartow, J. E. Breckenridge, C. G. Derick, H. E. Howe, Irving Langmuir, J. H. Long, L. M. Tolman and L. E. Weber, and the following committees:

EXECUTIVE. J. M. Matthews, chairman; Frank Hemingway, treasurer; L. H. Baekeland, H. R. Moody, P. C. McIlhiney, E.

G. Love, T. J. Parker, Allen Rogers, T. B. Wagner, A. E. Hill, C. M. Joyce, Chas. F. Roth, secretary.

FINANCE. L. H. Baekeland, chairman; Carleton Ellis, J. B. F. Herreshoff, E. G. Mackenzie, T. B. Wagner.

REGISTRATION. H. R. Moody, chairman; Chas. F. Bacon, D. D. Berolzheimer, Charles A. Lunn, F. J. Metzger, A. Nagelvoort, A. C. Neish.

RECEPTION. P. C. McIlhiney, chairman; J. Alexander, S. R. Church, H. M. Ittner, R. W. Moore, J. C. Olsen, Emil Schill, M. Toch, H. A. Metz, H. Schweitzer, E. G. Nellis, V. G. Bloede, J. G. Bergquist.

ENTERTAINMENT. E. G. Love, chairman; H. A. Baker, T. W. Pritchard.

HOTEL. T. J. Parker, chairman; T. R. Duggan, J. M. Weiss.

PRESS AND PUBLICITY. Allen Rogers, chairman; Ellwood Hendrick, B. C. Hesse, T. J. Keenan, A. Nagelvoort, E. F. Roeber, Charles F. Roth.

THE RUBBER SECTION.

THIS was the first meeting to be held by the rubber chemists for a long while, and the large attendance seemed to prove that this section of the Chemical Society is capable of doing some real constructive and research work in the rubber industry.

The transactions of this section were held at Rumford Hall at the Chemists' Club. Dr. L. E. Weber, of Boston, Massachusetts, was chairman, and Dr. John B. Tuttle, of Washington, D. C., secretary. The papers included the following:

"A Revision of Wesson's Method for the Direct Determination of Rubber," by J. B. Tuttle and L. Yurow.

"Wet Combustion in the Nitrosite-Combustion Method for the Direct Determination of Rubber," by L. G. Wesson and E. S. Knorr.

"The Aniline Method for the Determination of Fillers in Rubber Goods," by Otto H. Klein.

"Increase of Resins in the Vulcanization," by L. E. Weber.

"The Second Report of the Joint Rubber Insulation Committee," William E. Del Mar, secretary.

"The Rubber Chemist and the Rubber Trade," by Henry C. Pearson, Editor of THE INDIA RUBBER WORLD.

CHANGES OF RESINS IN VULCANIZATION.

Dr. L. E. Weber's paper had been announced under the title "Increase of Resins in the Vulcanization," but in his introductory remarks, he pronounced this somewhat of a misnomer, because, under the conditions under which the experiments were carried out, an actual decrease in the resin content resulted in the vulcanization process in the majority of cases. Dr. Weber said:

It is a generally accepted fact that in the course of vulcanization the resins show a material increase, the term resins being a convenient abbreviation of what is more accurately referred to as the organic acetone extract. The amount of this increase is said to vary, but is usually in the vicinity of 1 to 1½ per cent. That is to say, the rubber will show an actual resin content of somewhere between 4 and 5 per cent, whereas before vulcanization its resin content was between 3 and 3½ per cent. The nature and cause of the increase is not understood, in fact the whole subject has received very little attention. That this is so is rather to be wondered at, especially when one considers the fact that the resin content is our most reliable guide in recognizing the presence of high grade rubbers.

It has without doubt been observed on numerous occasions that rubber compounds very rich in rubber do not show this increase, their resin content being approximately the same before and after vulcanization. It therefore seems reasonable to suppose that certain of the mineral ingredients which are present in the more highly compounded stocks are responsible for the

increase, and it was in the hope of determining which of these minerals were effective that the experiments enumerated below were carried out. In order to observe more clearly the effect which the various minerals exert on the resins during vulcanization, the more common minerals were added in varying amounts to a standard rubber compound and the increase in the resin content determined analytically. The basic compound consisted of 100 parts of rubber and 8 parts of sulphur. A series of compounds were mixed up containing rubber and sulphur in the identical proportions but with varying percentages of zinc oxide, litharge, lime, calcined magnesia, white lead, barytes and whiting. These minerals were added in percentages based on the rubber. For instance, a typical compound would read as follows:

Rubber, 100 parts; sulphur, 8 parts, and litharge, 5 parts.

Or again:

Rubber, 100 parts; sulphur, 8 parts, and zinc, 20 parts.

In this manner the effect produced by the various minerals could be noted readily with a minimum of calculation. Of course,

more marked as the amount added increases up to 50 per cent. Zinc also seems to follow the same rule in that the resin content decreases with the amount added, whereas in the case where zinc oxide and litharge were both present, decrease in the resin content is about the same as would have been produced by the litharge alone. The cases of lime and magnesia are very interesting, even the relatively small amounts of 5 per cent producing very marked decreases.

An explanation of the above observations is hazardous, in view of the limited amount of experimental data. It is at once apparent, however, that the substances which bring about decreases in the resin content are all of a basic nature, and the two materials which are particularly active, namely, lime and magnesia, have a relatively strong basic nature. In view of the known fact that the resins from *Hevea* rubber are in part saponifiable, it seems reasonable to suppose that salts have been formed in the vulcanizing process between the saponifiable resins and the mineral oxides, with the formation of acetone insoluble metallic resinates. It is



DR. LOTHAR E. WEBER.



HENRY C. PEARSON.



DR. J. B. TUTTLE.

in each case the resin content is based on the actual amount of rubber present. For the sake of convenience all samples were cured in the press at 45 pounds pressure for various periods, depending on the nature and amount of mineral added.

The following table shows the changes in the resin content of the crude rubber, the crude rubber vulcanized with sulphur alone, and the compounds containing rubber, sulphur and minerals in various proportions.

Crude rubber gave resin content of 3.54 per cent.

100 parts rubber and 8 parts sulphur gave resin content of 3.53 per cent, based on rubber present. Additions of minerals as follows gave percentages based on rubber present:

5 per cent litharge gave resin content	3.6 per cent
10 per cent litharge gave resin content	2.8 per cent
20 per cent litharge gave resin content	2.7 per cent
50 per cent litharge gave resin content	2.1 per cent
20 per cent zinc oxide gave resin content	3.4 per cent
50 per cent zinc oxide gave resin content	3.1 per cent
20 per cent white lead gave resin content	4.0 per cent
20 per cent litharge and 10 per cent zinc oxide gave resin content	5.6 per cent
5 per cent lime gave resin content	2.5 per cent
5 per cent calcined magnesia, resin cont.	2.6 per cent
50 per cent whiting gave resin content	3.5 per cent
50 per cent barytes gave resin content	3.7 per cent

These figures are indeed surprising and directly in contradiction to what one would have expected. There is a much more marked decrease in the resin content than increase. To be sure, barytes and whiting are without effect one way or the other. This is more or less what one would have expected in view of their inert action in the vulcanization process. The addition of 20 per cent of white lead is the only case where there has been any appreciable increase. Even in this case the increase is so very small as to just lie outside the limit of analytical error. It is interesting to note the action of litharge. When added to the extent of only 5 per cent no change in the resin content is observed. There is a marked decrease on the addition of 10 per cent, which becomes

not improbable that a connection exists between the action of these minerals on the resins and the accelerating action which the former produce. This seems the more probable, in view of the fact that the elimination of the resins from the crude rubber practically inhibits vulcanization.

As already stated, the above samples were all vulcanized in the press, a fact which should be clearly borne in mind. The samples are at present being vulcanized in live steam and will doubtless show increased resin content on analysis. To be sure the introduction of live steam brings forth another factor into the vulcanizing process. From the above figures, however, it would seem, in the presence of metallic oxides, as if the primal tendency of vulcanization were rather to decrease the resin content than to increase it, probably owing to the formation of metallic resinates.

THE RUBBER CHEMIST AND THE RUBBER TRADE.

Mr. Pearson's address, in brief, was as follows:

As a text to my address I want to use a brief letter received this month from an old-time rubber superintendent—a man who has had an unusual measure of success, who is absolutely honest but thoroughly of the old school:

TO THE EDITOR OF THE INDIA RUBBER WORLD.

Dear Sir—A considerable space of every edition of your valuable magazine is given to "What the Rubber Chemists Are Doing."

It has been my privilege to talk with several managers and invariably each has a problem. When asked why not let the chemist work it out, they answer they have tried and failed to find the solution. Now is it true that chemists are of any advantage or only a fad, same as the game of efficiency that has been taken up by many, but is being gradually dropped? Chemistry and efficiency have their place in the world's work, but a good practical man

can make a rubber factory pay larger dividends than any corps of chemists running around with abstracted reasonings. If there is anything that gets the "goat" of a superintendent, it is to have some half-cooked chemist tell him how to run the factory. Very truly yours,

This naturally leads one to ask exactly what the status of the chemist in the rubber industry has been, what it now is, and is to be, and incidentally the status of the so-called practical man.

The beginnings of the industry, of course, were coincident with the discovery of vulcanization. Offhand one would say that Charles Goodyear was the discoverer—and he was, as far as the printed page goes. The fact, however, that before Goodyear's time the Indians up the Amazon were mixing gunpowder (because of its sulphur content), with rubber latex, spreading the mixture on cloth and exposing it to the strong rays of the sun, would really suggest that they had discovered vulcanization without knowing it. As they made no claim to such discovery, perhaps it would be well to let them go into the discard.

The discovery of vulcanization, as far as Charles Goodyear went, was the result of hundreds of experiments. It was the fortunate result of a constant groping after an ideal by an exceedingly pertinacious experimenter. That he didn't know exactly what he had done is proved by the fact that he patented the "triple compound," composed of rubber, sulphur and white lead and that for years after white lead appeared in every compound.

The English discoverer of vulcanization, Thomas Hancock, another practical man, worked for years trying to produce rubber compounds that would not get sticky in hot weather nor stiff in cold, and finally, securing through a friend named Brockedon a sample of the American vulcanized product, discovered sulphur on the surface. As a result he invented the type of vulcanization known as the sulphur bath. That is, he melted sulphur, immersed rubber in it, raised the heat and secured vulcanization.

About the same time Alexander Parkes, a chemist, produced a process of vulcanizing rubber by using chloride of sulphur; in other words, invented the cold cure.

In Germany during the years of the American and English search after vulcanization, Dr. Leudersdorff, of Berlin, through his own initiative, compounded rubber with sulphur, treated the surfaces with powdered sulphur, and at times got results that looked like vulcanization. He did not at that time appreciate what he had, but without doubt he would eventually have discovered vulcanization, even if the rest of the world had remained ignorant of it.

About the same time a Dutch apothecary named Jan Van Geun, who lived in Haarlem, put upon the market a rubber tubing that did not get stiff in cold weather, was not softened by heat and withstood acid. What his process was nobody knows, but the evidence goes to prove that he did discover vulcanization.

The matter thus stands, without counting the Indian, that the world's vulcanization of india rubber was discovered by two practical men, two chemists and a druggist.

American rubber manufacture divided itself into three periods. The first was of pioneering. In spite of the fact that vulcanization had been accomplished, the early manufacturers were a long way from being able to produce rubber goods in quantities, without a percentage of spoiled goods and seconds that would put any present manufacturer out of business. The early pioneers were Candee, Meyer, Poppenhusen, Day, Hartshorn, Hodgman and Hayward. None of these men were chemists, but they tackled their varied problems with undaunted courage and succeeded in spite of many failures. The next generation, which embraced the well-known names of Converse, Forsyth, Cheever, Spadone, Bourn, Banigan, Hood, Goodrich, McClymonds, Dale and Cowen, inheriting the compounds and processes of their predecessors, began to appeal to machinists and mechanical engineers to assist them in mechanical problems, and occasionally to chemists. In spite of this, the man who had worked up through the various processes, the practical man, was esteemed more than any other individual. It is only proper to say that he often possessed a high degree of skill, and that through his experience he was able to avoid many errors, and that his results showed in earnings that were sometimes remarkable. The old-time practical man was a czar when it came down to the question of compounding. In many cases he alone possessed the secret formulae, and if he left an employer he carried them with him.

To digress a moment, it might be interesting to cite one

of the formulae used by all of the great shoe factories during the early days. The upper compound, besides whiting, litharge, sulphur and tar, which were more or less necessary, contained white lead, lime and barytes. Just why, nobody knew. These ingredients, with the exception of the tar, were weighed out in quantity into a huge bin and then run through an old-fashioned burr mill for fineness. They were not known as compounds but as paints.

It must not be thought, however, that the practical men did not produce anything. They were the producers of excellent mixers, masticators, tubing machines, calenders and spreaders. They also designed scores of machines for the manufacture of belting, packing, hose, insulated wire and so on. When competition became fierce, they made bigger and better machines and cheapened their compounds where they could.

They also produced many valuable compounds and processes. Of these the most notable are the mechanical process for rubber reclaiming invented by Clapp, and the acid process invented by Mitchell, Bourn and McDermott. None of these men were chemists, although very early in his career as a manufacturer of reclaimed stock Mr. Mitchell employed chemists in consultation. Up to 1900 the chemist had made hardly any impression at all upon the rubber trade.

The writer was so impressed with the future usefulness of the chemist in rubber mills that he took occasion when opportunity offered to talk with the leaders of the trade, so as to learn their attitude regarding the possible value of a laboratory and a chemist in connection with their own problems. E. S. Converse stated that they had employed chemists, but that the cost to their company had been greater than any value received from their work. Joseph Banigan said, in a jocular vein, that "he had no use for chemists, druggists or apothecaries." L. K. McClymonds said that the value of the chemist would be simply in determining the purity of compounding ingredients, and that he hired a competent superintendent to look after that. Henry C. Morse said that he would give more for the guess of his old superintendent, Leigh, than for all the certainties produced by the best chemist on earth.

In those early days only two men took the chemist seriously. One was James B. Forsyth, of the Boston Belting Co.; but he had the misfortune to deal in secret with a man whom he believed to be a chemist, but who was really a charlatan and an expert user of chemical terms. It was a long time before Mr. Forsyth discovered that he was being fooled. Dr. Benjamin F. Goodrich, founder of The B. F. Goodrich Co., was the other man who thoroughly believed, almost from the beginning, that rubber manufacture was as much a chemical problem as a mechanical one. Very early he employed a German chemist, and indeed proposed to the writer that he come to Akron to be the president of a research laboratory and chemical plant, offering a block of stock, and saying in his enthusiastic manner, "I will make you rich." As I then had visions of starting a rubber paper, I refused something for which perhaps the Goodrich company should tender me a vote of thanks.

It was not until a young chemist from Boston, through a reclaiming process that he invented, made a spectacular success for himself and for his company, followed by an equally spectacular success in extracting rubber from low-grade gums and making much more money for himself and for his company, that rubber manufacturers in the United States really awoke to the fact that the chemist could be anything besides a dreamer of dreams and a tester of the purity of compounding ingredients.

Looking at the rubber trade of the United States of today, it is absolutely impossible to even indicate how much chemists have done in rubber lines. Their work in producing reclaimed rubber of better types than ever before known, and in handling stock that at one time went under the furnace, is a matter of common knowledge. So, too, are the various extraction processes that have rendered resinous rubber, such as guayule and Pontianak, of so much value to the trade. Also, in the speeding up of the great variety of compounds by new and harmless accelerators, their work has been beyond praise. In the rearrangement of compounds, in the production of new and valuable ones, and above all in the testing of everything that goes into the factory and goes out of it, they have revolutionized the old rule-of-thumb methods. So true is this that every mill of any note today has either its own laboratory or leans hard on some outside consulting laboratory. Nor would any manufacturer today, once having employed chemists, think of doing without them any more than he would think of eliminating steam or electricity in his power plant.

It is a pity that time does not permit me to name the many eminent chemists—English, German, French and American—whose research work as set forth in books, pamphlets and essays constitutes some of the most valuable of the world's technical literature. Such a list, with an adequate description of the work done, would, however, far exceed the limits of this paper.

The fact being, then, that the chemist has not only established himself, but has practically taken over the industry that should have been his from the beginning, leads one to ask, "What of the future?" Are the problems all solved? To an imaginative man it doesn't seem that much more than a beginning has been made. The remembrance of the beginning of "Bakelite," a real competitor for hard rubber, and of the "Cravenette" process an equally real competitor of rubber clothing, is exceedingly suggestive. Rubber is and always will be an expensive commodity. It is individual in its extreme elasticity and resiliency. Why, then, where the plasticity of rubber is alone made use of, as in clothing, belting, packing, hose, matting and a score of other things, should not some other plastic, waterproof of course, dispossess it, and isn't the chemist the man who will doubtless accomplish that? That would give much more rubber for the millions of automobile tires that are in sight for the next few years. It would also leave sufficient rubber for thread, elastic bands, and goods for which no other plastic is fitted. There is a suggestion, also, of a rubber compound for footwear that will be waterproof from the outside and will allow insensible perspiration to work out from the inside. Why, too, as long as rubber sheets can be made absolutely inextensible, should they not be a compound for tires, to do away with the necessity for strengthening fabrics, either woven or cord?

Again, looking at the rubber processes from a distance, it seems a bit awkward that so much heat and pressure and expensive machinery should be needed to accomplish vulcanization. Why should not the chemist of the future add some substance to the rubber mass which in the course of a few hours will effect vulcanization without the application of heat? Were this possible, its value in colored rubber goods would probably be incalculable. If this compounding vulcanization did not darken the mass, how easy it would be to make hard rubber goods pure white—to rival and even surpass celluloid and "galalith" in all their gaudy colors. Or if the chemist finds himself unable to do this, let him recall the fact that in the East there is a rubber tree the latex of which, on coagulation, is bright blue. It is his privilege to discover what gives that particular color, and by applying it to the great orchards of the Far East, produce rubber of all the colors of the rainbow.

Coming down from the realms of imaginary triumphs to those directly before the chemist, there are in his own factory quite enough and more than he can intelligently solve in years to come—those are individual. For the trade at large there is the standardization of almost everything that goes into the mill and comes out of it, and then, for our own country's preparedness, the production of a cheap, high-grade, synthetic rubber.

The succeeding papers were confidential communications that will not be released until further experiment has been carried on and the results checked up. Owing to lack of space the rest of the essays will appear, however, in the November issue of THE INDIA RUBBER WORLD. An exceedingly interesting symposium, led by Dr. Geer and participated in by some 20 other rubber chemists, will also be treated at length in the November issue.

THE CHEMICAL EXPOSITION.

THE National Exposition of Chemical Industries was held at the Grand Central Palace during the week, and nearly two hundred displays filled the main floor and gallery of the great exhibition hall. Of these, comparatively few were specially devoted to the rubber industry, but those that were included several of the most striking variety.

By far the largest exhibit was that of the Buffalo Foundry & Machine Co., Buffalo, New York. This occupied the entire end of the main hall, and included an installation of "Bufllovak" apparatus—a 1,600-gallon nitrator for manufacturing nitro-benzol; a 2,500-gallon caustic box for making caustic soda; a 700-gallon sulphonorator; an 8-foot horizontal type evaporator; vacuum drum dryer in operation; vacuum surface condenser; two stage vacuum pump; vacuum shelf

dryer; fusion kettle, equipped with stirring device; autoclave, crystallizing pan and a fully equipped nitric acid plant. All these huge pieces of apparatus bore their names in bold lettering. Around the booth were transparencies showing photographs of apparatus made by this company.

J. P. Devine Co., manufacturer of vacuum dryers, Buffalo, New York, exhibited a complete installation of a double drum vacuum dryer, the first one built in America. This included, besides the dryer, a surface condenser and motor drive. It is especially designed for drying, in vacuo, viscous heavy liquors and pastes. Another notable feature of the exhibit was a high pressure cast steel autoclave built to withstand a pressure of 1,000 pounds to the square inch. The Devine nitrating kettle was another feature of the exhibit, as was also a series of photographs of various forms of dryers, etc.

The Werner & Pfleiderer Co., Saginaw, Michigan, had on exhibition a number of their kneading and mixing machines, including the rubber masticator for dry compounding, which was described in THE INDIA RUBBER WORLD of September 1. There was also shown a huge vacuum type "Universal" kneading and mixing machine with a heavy double agitator, and a copper bowl rapid dissolver, machines well known in rubber and chemical manufacturing circles.

The Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pennsylvania, devoted its space mainly to an exhibit of controllers for electric motors. Among these was a Type F automatic control for alternating current motors, and a Type CS motor control.

The Bristol Co., Waterbury, Connecticut, showed recording instruments, including a recording thermometer for vulcanizers, an operation recorder for automobile tire presses which gives upon the traveling sheet 20 distinct operation records, and a new wet and dry bulb recording thermometer showing continuously the moisture content of the atmosphere.

E. I. Du Pont de Nemours & Co. and associated companies, including the Du Pont Chemical Works, Du Pont Fabrikoid Co., Fairfield Rubber Co. and The Arlington Co., had a very interesting exhibit of their products, including several chemicals used in the manufacture of rubber goods, their "Fabrikoid" for upholstery purposes, and rubberized cloth made at the Fairfield factory. There was also an exhibit of articles manufactured from "Pyralin," a substitute for hard rubber.

Another substitute for hard rubber, "Bakelite," was shown in the exhibit of the General Bakelite Co., New York City and Perth Amboy, New Jersey.

The exhibit of The J. H. Day Co., Cincinnati, Ohio, manufacturers of machinery used in mixing and compounding rubber, was most complete and interesting.

The Barrett Co., New York City, was well represented by a large and comprehensive exhibit, showing among other chemical products, toluol, benzol and carbolic acid, that are used by the rubber trade.

The Barber Asphalt Paving Co. had on exhibition among its asphalt products the "Genasco" mineral rubber, which is well known in the rubber trade. The Corn Products Refining Co., New York City, among other articles not used in the rubber trade, showed its well-known rubber substitute "Paragol," which is a sulphonated corn oil used as a filler.

The Luzerne Rubber Co., Trenton, New Jersey, exhibited hard rubber pipes and fittings, stop cocks, etc., for the conduction of acids, and also showed color boxes, photographic tanks, electrolytic cells, check ball valves and acid buckets.

Whitall Tatum Co., Millville, New Jersey, had an excellent exhibit of laboratory apparatus.

The exhibition was well patronized during every day and evening, not only by the members and guests of the American Chemical Society, but also by the general public. Moving pictures devoted to the exhibition of manufacturing and chemical engineering work were shown.

What the Rubber Chemists Are Doing.

THE STABILITY OF VULCANIZED RUBBER AND THE OPTIMUM CURE.

UNDER the above title Dr. Henry P. Stevens, in the "Journal of the Society of Chemical Industry" (August 31, 1916), presents the results of investigations made for the Rubber Growers' Association. The author remarks that in the manufacture of vulcanized goods the greatest care is taken to adjust the conditions of vulcanization to suit the particular compound to be vulcanized. Excess temperature or time will over-cure the product, and it will not age satisfactorily. Pronounced over-curing may exhibit inferior mechanical properties within a very short period of vulcanization, but in most cases the freshly vulcanized compound at first exhibits good mechanical properties, and it is only after a period of months or years that the over-curing becomes apparent by the gradual perishing of the rubber.

Pronounced under-curing also causes gradual deterioration, but the effect is not so marked as with over-cured rubber, and is more easily detected, as the mechanical properties of under-cured rubber are not fully developed.

It is obvious that for each particular rubber compound there must exist certain conditions of vulcanization, principally time and temperature, which will produce the optimum results. This cure has been termed the "optimum" or "perfect cure."

Schidrowitz and Eaton and Grantham have published their work on this subject. Each of these works was undertaken to compare the vulcanizing qualities of raw rubbers and to evolve a standard method of testing. These methods are based on the figures for tensile tests made on simple compounds of rubber with sulphur only, vulcanized for varying periods under constant conditions of temperature.

Eaton and Grantham say "we have always taken as the optimum, that point at which the product of the breaking load per unit cross section and the elongation is a maximum." Strictly speaking, they have taken the final length at rupture; that is, the elongation plus the original length, and multiplied this by the breaking load to give the product. This latter calculation appears to be the more correct.

The corresponding figure obtained by Dr. Stevens, termed "Tensile product," represents the breaking load per unit cross-sectional area of test piece, when the latter is fully stretched, as the volume of a piece of vulcanized rubber does not show appreciable alteration on deformation. The specimen giving the maximum product is held by Eaton and Grantham to be that which has been subjected to the optimum cure. It is obvious that if a number of vulcanizations be carried through with one compound for progressively increasing periods, some specimens may be under-cured, some over-cured and one will lie in the neighborhood of the correct cure, but it would be a mere chance if this last specimen were vulcanized for exactly the period required to produce the optimum effect.

These methods fail to take into consideration the fact that tensile properties of a vulcanized rubber are not constant, but vary with the age of the specimen.

Research work of recent years has shown that vulcanization proceeds after the actual vulcanization process is completed, and that vulcanization takes place, although very slowly, at the ordinary temperature of the air.

Dr. Stevens regards the vulcanization process as a sort of impulse, and the momentum induced carries on the vulcanizing effect after the vulcanization process is complete.

A specimen of vulcanized rubber, if tested at intervals of time over a given period, shows progressive changes during that period. Thus the product of the breaking strain and elongation of a specimen tested the day after vulcanization will usually give

figures which are lower than those obtained if the test be made a week or a month later. The term "optimum cure" if it is to have any practical meaning, must connote not only the physical properties of the freshly vulcanized rubber but also its aging.

There is another guide to correct curing, namely, the figure for the coefficient of vulcanization. With many types of compound this figure is difficult to ascertain, even approximately, but in a simple type, consisting entirely of rubber and sulphur, it is only necessary to extract exhaustively with acetone and to determine the sulphur in the residual rubber, expressing the results as a percentage of the raw rubber originally taken.

Dr. Stevens has carried through a comprehensive series of tests with the compound employed by Eaton and Grantham, composed of rubber with 10 per cent of sulphur. In each case the tests were carried out on the same lines as those of Eaton and Grantham, except that the vulcanized specimens were tested at intervals, the last test being put through approximately ten months after vulcanization. The rubbers employed were pale crepe and smoked sheet rubbers of ordinary commercial quality.

The results of the investigation prove conclusively that a rubber compound subjected to Eaton and Grantham's "optimum cure" is undoubtedly over-vulcanized, or over-cured, and that the word "optimum" is consequently incorrectly applied. If, however, Eaton and Grantham's definition be modified so as to include the aging factor, we have what appears to be a very good definition of the optimum or correct cure. It may be provisionally defined as that cure which gives the maximum figure for tensile product after full period of aging. It is not at present possible to define more exactly the period of aging. With rubber compounded with 10 per cent of sulphur only, the results show that the period should exceed the ten months allowed in the present experiments. Probably two or three years will be required. The vulcanized specimens must be preserved under suitable conditions and should not be exposed to light. It must not be forgotten that the temperature and possibly also hygrometric and other conditions of the atmosphere affect both the aging qualities and the physical tests.

The coefficient of vulcanization can only be taken as an approximate guide to the condition or degree of vulcanization. A figure for the coefficient exceeding 3.50 per cent for a vulcanized rubber and sulphur compound is an almost certain indication of over-curing.

ANILINE OIL POISONING.

In a communication to "The Journal of Industrial and Engineering Chemistry," W. W. Sanders relates the experience of the Goodyear Tire & Rubber Co., Akron, Ohio, with regard to its manufacture and use of aniline oil.

Since November, 1914, the company has manufactured about 1,500 tons of aniline, without a single fatality due to poisoning. This is the result of a persistent campaign to eliminate every possible source of danger and to care promptly for such cases of poisoning as have actually resulted. Men who are working constantly in the aniline plant and who have, in a measure, become immune to the effect of aniline vapor, show bluish lips and skin; the poisoning does not seem to go beyond that stage, and the men are not inconvenienced in any way. The severest cases have resulted from the spilling of aniline, nitrobenzol, or aniline hydrochloride directly upon the skin.

Realizing that poisoning may be caused either by inhalation of vapor or direct contact with liquid, the manufacturing precautions have been based on these two points. The building is provided with suction ventilating fans in the roof. Several 24-inch fans, located in the exterior side wall of the building, play

streams of air directly upon the men while they are at their operating positions. In fair weather the windows are removed, at other times satisfactory floor ventilation is provided. Suction ventilating ducts are led directly to stuffing boxes and iron boring feeders, where there is always more or less escaping vapor. The manufacturing system is closed, so that it is unnecessary for open aniline to be handled. Drinking men are excluded from the operating force. The men are provided by the company with regular rations of milk, with two clean working uniforms weekly per man, and with rubber boots. Shower baths are installed and their daily use insisted upon. Frequent inspection for leaks is made of pumps, valves and stuffing boxes.

The necessity of replacing the stirring paddles in the aniline reducers is the cause of many of the poisoning cases observed. In spite of continued washing and steaming out, there is sufficient aniline saturating the residual iron borings in the reducer bottom to make it inadvisable for men to remain in the reducer for more than a half hour.

METHODS OF ANALYSIS.

IN the article "Select Methods of Analysis of Golden Sulphide of Antimony" published in this department in August, credit was unintentionally omitted. It was condensed from the original in "Le Caoutchouc & la Gutta-Percha," by André Dubosc.

The following article is by the same author and also from the same publication:

SULPHIDES OF ANTIMONY AND THEIR ANALYSIS.

Golden sulphuret of antimony or pentasulphide of antimony is an important factor in the manufacture of inner tubes, druggists' and surgical rubber goods.

The pentasulphide is in non-stable equilibrium and under the increase of temperature, which occurs in the course of hot vulcanization, releases colloidal sulphur, which unites with rubber easier than flowers of sulphur.

This dissociation occurs at 130 to 135 degrees C., leaving as residuary product red trisulphide of antimony, a pigment, giving to the product the beautiful red color sought by the trade.

Red trisulphide under the same conditions, does not give the same results as the pentasulphide. It does not release the colloidal sulphur necessary for vulcanization. At 130 to 135 degrees C., it has a tendency to change into black sulphide. Instead of red goods, brownish unsightly products are obtained.

Under these conditions, one can realize the importance, from a practical standpoint, of knowing the trisulphide content of the golden sulphurets offered by dealers.

The manufacture of golden sulphuret of antimony is much more delicate than many imagine it to be and, even when starting from Schlippe's salts, very minute precautions must be taken to escape changing the pentasulphide or real golden sulphuret of antimony into the almost valueless trisulphide of antimony.

That is what many do not know and it explains the lack of value of some of the products found in the market.

Following are a few analyses of such products offered in the trade, which, in view of their composition, will not give complete satisfaction in vulcanizing.

GOLDEN SULPHURET A.	
PENTASULPHIDE OF ANTIMONY.....	21.600%
TRISULPHIDE OF ANTIMONY.....	77.900%
GOLDEN SULPHURET B.	
PENTASULPHIDE OF ANTIMONY.....	43.000%
TRISULPHIDE OF ANTIMONY.....	57.000%
GOLDEN SULPHURET C.	
PENTASULPHIDE OF ANTIMONY.....	57.825%
TRISULPHIDE OF ANTIMONY.....	40.735%
GOLDEN SULPHURET D.	
PENTASULPHIDE OF ANTIMONY.....	23.291%
TRISULPHIDE OF ANTIMONY.....	76.029%

Most of these products, owing to their high content of trisulphide, are only interesting as pigments; for, as vulcanizers, their reaction is very weak.

Such goods should be replaced by the types which contain lime sulphate as impurity, but in which all the antimony is in the form of pentasulphide as shown in the following analysis:

ANTIMONY SULPHIDE P No. 1.

PENTASULPHIDE OF ANTIMONY.....	64.69%
FREE SULPHUR.....	13.40%
LIME SULPHATE.....	9.85%
OXIDE OF ANTIMONY.....	12.046%

ANTIMONY SULPHIDE P No. 2.

PENTASULPHIDE OF ANTIMONY.....	56.998%
FREE SULPHUR.....	15.000%
LIME SULPHATE.....	28.002%

ANTIMONY SULPHIDE P No. 3.

PENTASULPHIDE OF ANTIMONY.....	68.099%
FREE SULPHUR.....	18.000%
LIME SULPHATE.....	13.901%

These products are perfectly manufactured. They were obtained starting from Schlippe's crystallized salt, and are precipitated by sulphuric acid. Their only impurity is lime sulphate.

With pentasulphides, like those of series P, the reduction does not extend to black sulphide, but stops at red sulphide, yielding colloidal sulphur, and therefore permitting (1) a more rapid vulcanization; (2) a perfect red and not a brownish coloring.

TOTAL SULPHUR IN RUBBER.

Davies' method consists in treating a half gram of finely ground vulcanized rubber in a 300 cc. Erlenmeyer flask with 15 cc. of saturated solution of arsenic acid, 10 cc. of fuming nitric acid and 3 cc. of saturated bromine water. The mixture is covered and boiled till oxidation is complete and the solution clear. If needed, more nitric acid may be added. The solution is evaporated to syrupy consistency, a few crystals of potassium chlorate added, and evaporation continued nearly to complete dryness, to expel entirely the oxides of nitrogen. After cooling, take up in 50 cc. of 10 per cent hydrochloric acid, heating over a water bath until solution is complete. The insoluble matter is separated by filtration and the filtrate diluted to 300 cc. from which the sulphate is precipitated in the usual manner.

The action of the arsenic acid is to raise the boiling point of the solution and to produce oxidation. The reagent is prepared by addition of arsenious anhydride to water till its boiling point is raised to 284 degrees F.

COLOPHONY IN SHELLAC.

A. Hutin in "Le Caoutchouc & la Gutta-Percha" discusses the adulteration of shellac and describes his methods for qualitative and quantitative determination of colophony which is a common addition for cheapening shellac.

QUALITATIVE TEST.—A gram of finely powdered gum lac is saponified with a slight excess of caustic soda, diluted with water and slight excess of copper sulphate solution added. If colophony is present resinates of copper is formed which will give a green color to turpentine. Pure gum lac under these conditions gives no indication.

QUANTITATIVE TESTS. (a) A gram of finely pulverized shellac is dissolved in 97 or 98 degree alcohol. Sand is added to form a mass and the whole evaporated to dryness on a water bath. The process of solution in alcohol, addition of sand and drying is performed three times to eliminate the gum lac, each time the mass being scraped from the dish. The gum lac and sand from these operations is extracted in a Soxhlet for four hours with chloroform. The colophony is dissolved, while the gum lac is not affected. (b) Add to one gram of finely powdered gum lac 50 cc. of 10 per cent borax solution. The gum lac will dissolve, but the colophony will not. Should the gum lac contain a phenol-formaldehyde condensation product as an adulterant, the latter would not dissolve in the

Replete with information for rubber manufacturers—Mr. Pearson's "Crude Rubber and Compounding Ingredients."

New Machines and Appliances.

RUBBER SHOE PATTERN ROOM.

MANY problems relating to style, fit, construction and economy of stock are involved in designing and making ready for the manufacture of a line of rubber boots or shoes. These problems come for solution to the pattern room. Such a room is shown in the illustration of the pattern department of the La Crosse Rubber Mills Co., La Crosse, Wisconsin. In addition to solving questions of design and construction, the pattern room furnishes the many sheet metal patterns needed by the factory in the manufacture of goods. These patterns are standardized and graded accurately to size and shape corresponding to the parts they represent in the shoe. The number of such patterns necessary in a factory is very large and subject to constant change and renewal.

Several features of pattern room work are clearly shown in the picture. On the drawing board in the foreground the pattern maker lays out a complete set of patterns for a middle size shoe, and cuts them from heavy paper. These serve as original



PATTERN ROOM OF LA CROSSE RUBBER MILLS CO.

standards, and by means of a stamping machine, seen in the background, they are reproduced in proper gradations for every size of shoe desired.

The graded sets of paper patterns are next transferred to sheet metal for use by the rubber cutters. This is accomplished by outlining the paper pattern on stout sheet tin and, by means of heavy, hand-operated bench shears, cutting the tin to the outline, as the operator in the foreground is doing. Careful size marking and filing is necessary to render the standard paper patterns always accessible, and provision for this may be seen in the various tools and furniture shown in the cut.

SOME GARVIN HARD RUBBER LATHES.

In the manufacture of fountain pen barrels and caps, pen and pencil holders, syringe and atomizer parts, electrical switch handles and many other hard rubber products, speed and turret lathes are important. In the illustration, Fig. 1, are shown two views of a 10-inch speed lathe commonly used in hard rubber mills for turning, threading and chasing. The bench lathe is shown in the first view with the combination cutting hob and leader that operates the chasing bar. In the second view the same machine is shown with floor legs and the chasing bar attachment removed. The lathe has hardened and ground spindles, running in conical-shaped solid bronze boxes and is provided

with a tight and loose pulley in the spindle. It is driven from a countershaft placed at the back of the lathe and connected to the main line.

The No. 2 screw cutting lathe, shown in Fig. 2, has a plain turret-head, automatic collet, a bar feed, and is very similar to

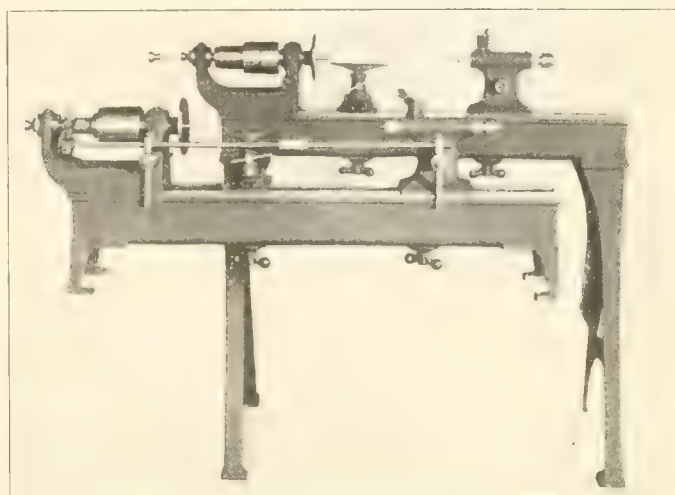


FIG. 1.—HARD RUBBER SPEED LATHE.

the No. 1 lathe, but is larger and capable of handling hard rubber rods up to 1 inch in diameter. It has tight and loose pulleys in the head instead of a cone pulley and the belt shifter is directly underneath the pulleys. The counter shaft is placed on a bench directly back of the machine which is driven by straight and cross belts.

Another interesting hard rubber turret lathe is furnished with short bench legs or floor legs as desired. This tool is designed to handle a greater variety and quantity of work than the lathes previously described. It has a power feed and an auto-

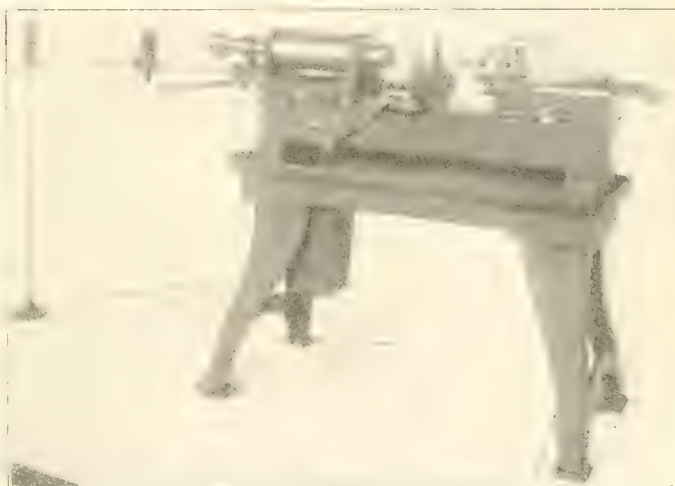


FIG. 2.—No. 2 HARD RUBBER LATHE.

matic turret, automatic collet and bar feed for handling rubber rods up to 1½ inches in diameter. The slide rest, besides having the hand lever operated cross motion, is provided with a sidewise swiveling movement. [The Garvin Machine Co., New York City.]

A CONVENIENT CEMENT CAN.

Receptacles and cans that are intended to hold inflammable mixtures should be designed with the idea of reducing the fire hazard to a minimum. Experience has proven that they must be made in such a way that their contents in case of fire will burn off slowly, confining the fire to the immediate vicinity instead of exploding and scattering the fire over a large area.

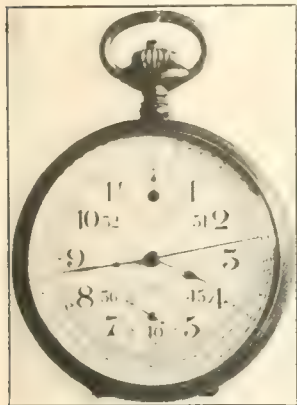


The illustration shows a cement can designed for a supply room and one which can easily be transferred to and from the cement house. It is constructed of heavy galvanized sheet metal with slanting bottom and a tight-fitting cover that prevents evaporation

and acts as a safety valve in case of fire. The quick closing gate valve saves time and reduces waste. The can is made in two sizes, holding approximately 5 and 10 gallons, respectively. [United Awl & Needle Co., West Medway, Massachusetts.]

THE MASTER CHRONOGRAPH.

Two of the principal causes that result in loss of profits to the rubber industry are loss of time and unnecessary motion. Careful investigation would doubtless bring to light in many plants the presence of leaks that are directly responsible for the failure to make goods at a profit.



The master chronograph is a specialized watch that is used as an aid in studying mechanical operations. The chronographic feature operates in seconds and fifths of seconds. The figures on the extreme outside of the dial are spaced one second apart and represent at any point of elapsed time exactly what the corresponding output or production per hour is, when the operation is of one minute's duration or less. The figures on the extreme inside of the dial,

such as 51, 45, 40, etc., represent operations per hour, when an operation goes past one minute and into the second minute. Between these figures one can easily scale the result. For instance: If it requires 29 seconds to perform one operation, as shown by the stopping of the large hand, the reading 124 directly under it is the corresponding output per hour.

If the hand is stopped over 19 seconds the reading directly under it shows the output to be 190 per hour.

Let us assume that the operation is of longer duration than one minute, that the large hand made one entire revolution and went on to ten seconds beyond, or one minute and ten seconds. The reading in that case would be 51 operations per hour, inasmuch as all figures for the second minute are placed on the extreme inside of the dial.

In the case of very short operations it is usually good practice to time ten operations and add a cipher to the amount shown on the computed dial.

Let us assume that it is desired to ascertain the number of

strokes per hour of a press or the production of an automatic machine, and while we count ten strokes or pieces, as the case may be, the hand reaches 19 seconds. Reading directly under it and adding one cipher, we have 1,900 as the number per hour.

For motion study and lost motion determination, rate standardization, general cost data and all other short time operations, this device is obviously useful. [Mortimer J. Silberberg, Chicago, Illinois.]

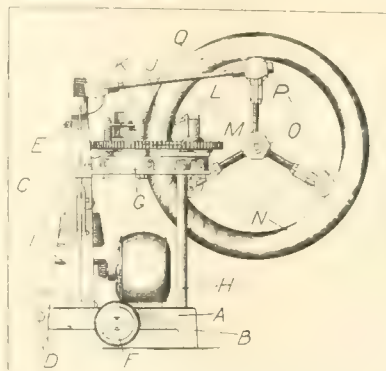
MACHINERY PATENTS.

PORTABLE RAG WRAPPING MACHINE.

THIS machine, designed for wrapped tread tires, provides a spider of novel form on which the tire remains from the time it is taken out of the mold, after the first cure, until the completion of the wrapping process and its removal for the final cure. Moreover, the machine is portable and self-contained, so

that it may be brought into action successively upon tires supported on different spiders.

In the drawing, *A* designates the base of the machine, the back of which rests upon legs *B*, while at its forward edge a pair of bars *C* are pivoted at *D*, the upper ends being connected by a handle *E*. When this is swung downwards the ends of the bars



are raised from the floor, and the machine is free to be moved about on rollers *F*.

The table *G*, supported by rods *H* and standards *I*, has a central opening above which is mounted on anti-friction rollers the annular gear *J*, provided with a hinged segment that admits the tire to the opening in the table. This annular gear is driven from the vertical shaft that is journaled in the frame and driven by the electric motor mounted on the base plate.

The fabric spool *K*, mounted on the annular gear, contains the wrapping strip *L*, that passes around the tension guide *M* to the tire *N*.

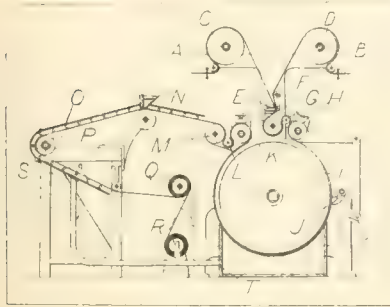
While the tire is being built up, the spider *O* acts as a core chuck, but in the wrapping operation it assists in rotating the core. The spider has three arms supporting the screws that adjust the three rollers *P* to the inner circumference of the tire by miter gearing located in the hub. Each roller is bushed and key-wayed to fit the short, splined stub of the portable jack shaft *Q* that is driven from the vertical shaft and rotates the tire.

In operation the hinged segment *K* is raised and the machine swung in position so that the tire enters the gap when the segment is closed. Then the jack shaft *Q* that transmits power from the vertical shaft to any one of the rollers *P* is connected up, and the machine placed in motion, whereby the tire is slowly revolved by the pulley *P*, and the strip of fabric *L* is spirally wrapped around the tire by the revolution of the horizontal gear *J*. [William C. Stevens, assignor to the Firestone Tire & Rubber Co.—both of Akron, Ohio. United States patent No. 1,194,565.]

MACHINE FOR MAKING AND COATING WEFTLESS FABRICS.

The method consists in using two parallel warps of threads of indefinite length, each warp having the width of the finished fabric, but each having a number of threads equal to half the

total number of threads in the finished fabric. The threads of each warp are inserted between threads of the other warps,



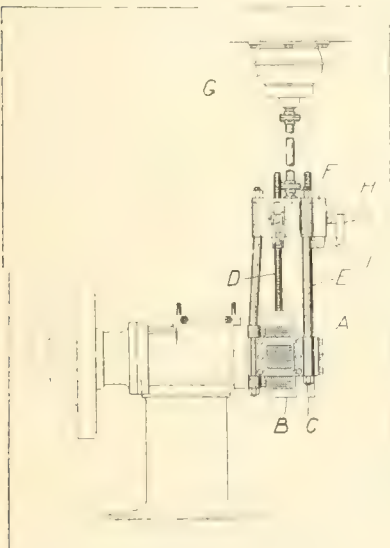
downward through the vertical comb E, which unites the two half warps in a single layer.

After passing around the roller F and between rollers G and H, where it is impregnated with rubber solution, the fabric is guided over the heated drum I, and the spreading device J applies a coating of rubber to the front surface. It then passes around the drum, over the water cooled roller K, and between rollers L and M to the spreader N, which rubberizes the back surface of the fabric.

The fabric, which is now coated on both sides, passes under the steam-heated hood O, and around the guide roller P to the wind up roller Q, the liner being supplied from roller R. The solvent vapors are drawn through pipe S by a suction pump to the chamber T, into which are also drawn vapors from the drum I. [Eugene Bourdin, Lyons, France. United States patent No. 1,195,554.]

MECHANICALLY OPERATED STRAINER HEAD.

To avoid difficulty and loss of time attendant in changing the strainers of rubber reclaiming machines when they become clogged, is the object of this invention. The accompanying



drawing is a side elevation of a tubing machine showing one of the three mechanically operated strainers and the operating motor attached overhead. The strainer head A discharges in three directions longitudinally and laterally, and is bolted to the tubing machine head, forming a continuation of the stock discharge passage. It is chambered for steam and provided with guideways in which the three strainers slide vertically. One of the side strainer heads is shown at B, and C is a side elevation of the front head. These are raised and lowered by screws, one being shown at D, that are turned by three splined gears located in the casing F and driven by a pinion and vertical shaft connected to the motor G. The individual movement of the screws is controlled by three levers, one of which is shown at H, each lever being provided with a pivoted link I, that automatically stops the movement of the strainers beyond a prescribed point.

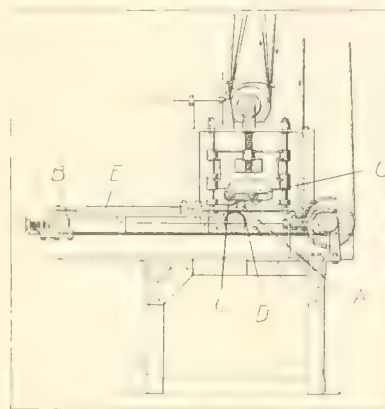
The strainers are rectangular perforated plates in two sections that are removably held in the strainer frame, their perforations

registering with those of the frame plate and a wire mesh of finer gage, in two sections, interposed between. Thus the fine wire strainer is protected from injury by the larger particles of metal and other solids in the rubber and holds back the finer particles and shreds of fabric. When the strainers become clogged they are raised or lowered, as the case may be, until one of the sections clears the head and the other is opposite the outlet, then the clogged section and wire sheet are removed for cleaning without interrupting the operation of the machine. [Frederic B. Garrahan, Paterson, New Jersey. United States Patent No. 1,195,576.]

INNER TUBE ROLLING MACHINE

Generally speaking, inner tubes are made by hand, and therefore the following illustrated description of a new mechanical device for doing this work is of interest.

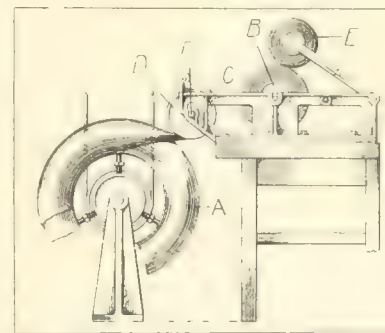
Referring to the drawing, which is a side elevation of the machine, the operation is briefly as follows: The pole A is placed on the endless belt carrier B, and the four narrow rollers, two of which are shown at C, C, are brought down in contact with the ends of the pole and supported by the idler roller D, located under the belt. The sheet of rubber stock is now laid on the platen E, which rests upon and moves with



the belt carrier. The upper edge of the sheet is then solutioned, the carrier belt placed in motion, and the platen and the superposed sheet of stock are carried into the machine to a point where the edge of the sheet becomes attached to the revolving pole upon which it is rolled up, the platen being checked in a position which imparts a slight tension to the sheet and delivers it smoothly and evenly to the pole. [Frank Fenton, assignor to the Miller Rubber Co.—both of Akron, Ohio. United States patent No. 1,197,192.]

TIRE BUILDING MACHINE WITH FABRIC STRETCHING DISKS.

The object of this invention in tire building machines is to apply a positive and predetermined stretch only to such points in the fabric strip where stretch is necessary to make the fabric conform to the shape of the core. Thus, longitudinal stretch in the margins of the fabric strip is eliminated, puckering obviated and the stitching operation reduced to a superficial rubbing.



The drawing is a side elevation of the machine showing a tire core A mounted and driven in the usual way. On the table will be seen the stock roll B, from which the frictioned fabric strips C are passed around an idler roller and then down and around the stretching drum D to the core, the liner being wound up on the roller E.

preferably by the cold process, to obviate the possibility of the stock softening and thereby losing its characteristic surface appearance. It is therefore better to effect the cure by dipping for a short time in a weak solution of sulphur monochloride. [Goodyear's Metallic Rubber Shoe Co., Naugatuck, Connecticut. British patent No. 100,727.]

METHOD AND APPARATUS FOR RECLAIMING. Rubber scrap of different densities is reduced to a pulp in water which is mixed with a heavy oil, and air is admitted to the bottom of the tank causing the particles of low specific gravity to rise to the surface with the oil, while the heavy particles settle. The film on the surface containing the lighter rubber is skimmed off by a slowly moving endless conveyor, while the heavier particles which settle are removed by the same means. [Thomas J. Pennington, Chicago, Illinois. United States patent No. 1,195,264.]

OTHER PROCESS PATENTS.

THE UNITED STATES.

- 1,195,118 Process of making ball rubber articles.—H. W. Higdon, Park, N. J., assignor to The India Rubber Co., a corporation of New Jersey.
- 1,197,396 Process of treating textile materials.—R. B. Price, assignor to Rubber Regenerating Co.—both of Mishawaka, Ind.
- 1,197,912 Method of manufacturing footwear.—J. R. C. Cuthbertson, to National India Rubber Co.—both of Bristol, R. I.

THE DOMINION OF CANADA.

- 19,566 Rubber and ban value added together 6 1/2 per cent. More than half.

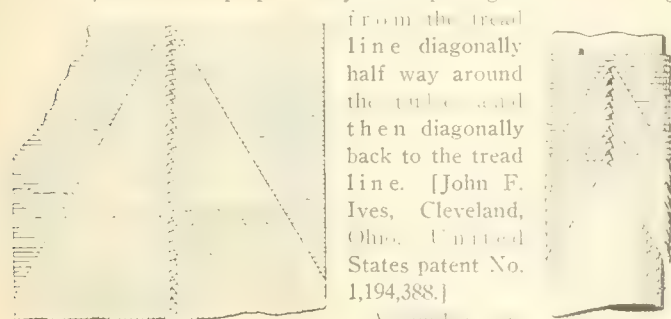
THE FRENCH REPUBLIC

- 479,856 (September 14, 1951). Improved rubber sole for
 ber footwear. Boston Rubber Shoe Co.

MISCELLANEOUS PATENTS.

CORD TIRE FABRIC.

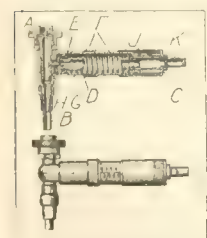
A CORD fabric tube is built with two layers of rubberized cord, the inner layer laid at right angles to the axis of the tube, and the superposed layer comprising cords extending



ent granted to the same inventor covers a twoply fabric strip composed of two layers of rubberized cords, the inner layer extending at right angles to the edges, and the superposed layer extending diagonally from the center to the opposite edges of the strip. [John F. Ives, Cleveland, Ohio. United States patent No. 1,194,389.]

SAFETY PRESSURE GAGE

The inventor of this device has combined an air pump connection with a pressure gage that may be set to the required tire pressure, and when this point is reached the excess air escapes with a whistling sound. In the drawing, the upper is a sectional view and the lower one a side elevation of this device.

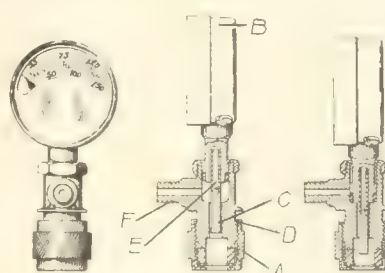


forcing back the spring F , and causing the valve G to move

away from the valve *H*. This allows the air to escape between them, and to flow through the opening *I* and the sleeve *J*, causing the whistle *K* to indicate that the desired pressure has been reached. [Frederick A. Schroeder, assignor to the Hill Pump Valve Co.—both of Chicago, Illinois. United States patent No. 1,196,142.]

TIRE PRESSURE INDICATOR.

In the accompanying illustration, the drawing on the left is a front elevation of this device, showing the valve and pressure indicating dial. Referring to the central drawing, the end of



which will indicate the tire pressure on the dial. If additional air is required the manual pressure is removed from the dial and the air pressure raises the gage to the position shown in the central figure. Then air from the source of supply freely passes through the opening *F* into the central opening, and thence through the valve into the tire, the pressure being sufficient to unseat the valve. [James W. Frazier and Fred E. Hansen, Cleveland, Ohio. United States patent No. 1,196,226.]

GOLF BALL. This patent provides an inner rubber bag or container filled with liquids of different specific gravities, one of which is mercury. [William R. Knight, Belleville, assignor to St. Mungo Manufacturing Co., Newark—both in New Jersey. United States patent No. 1,194,751.] A similar patent granted to the same inventor was illustrated in THE INDIA RUBBER WORLD, September 1, 1916, page 662.

LEAK ALARM. A rubber bulb is made integral with the inside of the inner tube and provided with a whistle which gives an effective alarm when the tube becomes deflated to a predetermined extent. [George W. Wells, assignor to Walker-Wells Co.—both of Amesbury, Massachusetts. United States patent No. 1,195,883.]

THE UNITED KINGDOM.

RUBBER COVERED ROLLERS. Rollers of the cushion type with a metal core around which rubber tubing under fluid pressure is spirally wound and an outer sleeve applied and vulcanized, have been covered in British patent No. 2,606, 1915, by the inventor of the following patent. The present invention relates to means for preventing the spiral tubing from creeping endwise. [Jabez Muskett Pendleton, Manchester, England. British patent No. 15,001 (1915).]

HARD RUBBER STORAGE BATTERY SEPARATOR. A thin hard rubber separator is molded with longitudinal ribs on the sides between which are additional ribs formed on one or both sides of the separator, tapered, thickened portions being provided at the ends to obviate longitudinal breaks, and it is then finished by punching perforations in the thin portions. [The India Rubber Co., New York City. British patent No. 100,994.]

COATING PNEUMATIC TIRES. This device provides a circulation of air within the inner tube and through an outside tube so that the air within the tire will remain cool during travel. This is obtained by attaching an annular tube to the spokes of the wheel and connecting it to the inner tube of the tire, the air circulating freely between both tubes. [P. J. Cuddihy, Rutherford, New Jersey, British patent No. 100,897.]

New Goods and Specialties.

RED RUBBER DOLLS

FOR years the toy buyers of America have looked to the German factories for amusement devices of all kinds. The war has stopped this trade and for the holidays this year practically all toys will be of American make.

Among the novelties for the coming season are the clever Dutch dolls shown here.

These rubber toys are claimed to be the only red rubber toys made in America. Being made from solid red stock they will not peel as do some

veneered rubber toys. For this reason they are absolutely safe for children and may be put in the mouth and played with without chance of harm.

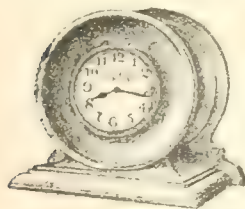
These dolls are made as boy and girl. The designs are live and attractive, the little figures standing sturdily on their feet, the base being substantial enough to form a good pedestal. [Davol Rubber Co., Providence, Rhode Island.]



RUBBER-INCASED DESK CLOCK.

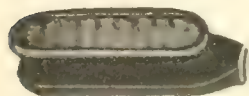
In many factories the constant vibration of the machinery is communicated so strongly to the floors and furniture as to interfere with the accurate running of clocks. Sometimes the presence of electricity acts as a similar preventative. To overcome this the "Nojar" desk clock shown here has been perfected. The works are of a first class make of such clocks, but instead of a wood or metal case is one of heavy rubber, which insulates the works from electricity, and cushions them from the vibrations. The design is chaste, and

the clock is an appropriate fixture for workshop or office and is also a convenient timepiece for a traveler, as it can be carried in the bag or suitcase, without special packing. [Pennsylvania Rubber Co., Jeannette, Pennsylvania.]



TOOTH-BRUSH ATTACHMENT.

The recently patented tooth-brush attachment shown herewith consists of a small piece of rubber made to slip up over the handle, around the back, and up above the sides of the brush,



having a bead of about one-eighth of an inch approximately flush with the ends of the bristles. Its purposes are to massage the gums while the teeth are being brushed, to hold the water and powder within the bristles, and to prevent the back and sides of the hard portion of the brush from injuring the gums. If it is desired to carry the tooth-brush in the pocket or in a traveling bag, the bristles may be turned around so that the rubber

attachment acts as a protective covering. [Theodore R. Plank, Los Angeles, California.]

"RINEX" SOLES.

With the cost of sole leather reaching unparalleled heights, the demand for a substitute has been far reaching and imperative. One of the new comers in this field is the "Rinex" sole, which is claimed to have all the good qualities of leather soles and rubber



soles, with none of the objections of either. This sole is recommended for lightness, toughness, flexibility, comfort, and wearing qualities. It is composed largely of rubber, with other materials, which add to its efficacy. It is made in the various shapes and thicknesses required by the shoe manufacturer, and in black, white and tan colors. [The United States Rubber Co., New York City.]

DECORATED TOY BALLS.

Rubber balls as toys for children come in more and more attractive guise, to delight the eyes and hold the attention of

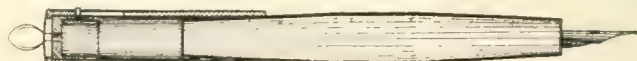
their youthful owners. The inflated rubber balls here shown are coated in assorted solid colors with a "New Process Finish," which affords a bright glazed surface claimed not to check nor crack. Imprinted on both sides, in the same color or in a different color for each side, are various decorations, illustrating nursery rhymes, circus ani-



mals, baseball figures, etc. These balls are furnished in three diameters: 2 3/8, 2 1/2 and 3 1/2 inches. [The Faultless Rubber Co., Ashland, Ohio.]

STEEL ERASER FOR FOUNTAIN PEN.

A small steel knife or eraser attachment housed within the rubber cap of a fountain pen affords a handy device for scratching out ink marks from penned or typewritten records. It is also applicable to ink pencils, lead pencils, etc. To accommodate this attachment, no change is necessary in some fountain pen models



and but slight lengthening in others. A tubular plunger carrying the blade or knife is inserted in the cap, the movement of

this plunger to bring the knife out through a slot in the end of the cap, and back inside, being effected through a small pin projecting from a bayonet slot in the side of the cap. [W. E. Meadwell, Ithaca, New York.]

CUSHION RUBBER-SOLED CANVAS SHOE.

In this high-tensioned age the majority realize the importance of reducing or eliminating shocks to the nervous system, and a shoe sole that prevents shock in walking would rightly be considered a benefaction. In the "Aviator" sport and tennis shoe, here shown, a resilient cushion, comprising a filler of aerated or sponge rubber between the inner and outer soles of the shoe, serves as a shock absorber and heat insulator. The illustration shows a shoe cut through the center longitudinally, revealing the air-spaced rubber filler, which, it will be seen, is doubly thick at the heel, where the need of a shock absorber is greatest. This gives also an added springiness to the step, a real aid to pedestrianism, while for protracted gymnasium work on hardwood floors, "Aviator" shoes are said to produce less than half the fatigue ordinarily felt when wearing the usual sporting shoes. [Canadian Consolidated Rubber Co., Limited, Montreal, Canada.]

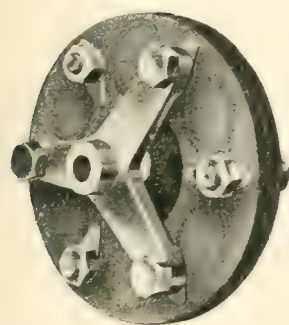


A FLEXIBLE COUPLING AND UNIVERSAL JOINT.

The old type of universal joint, while generally positive and effective, has its objectionable features. To overcome these and give one of uniform strength in every direction, and between all points, and to reduce shocks and give more elasticity, the Thermoid-Hardy Fabric Flexible Coupling has been evolved. The main features of this invention are two three-armed spiders, attached on opposite sides of a flexible disk, at alternate points. These disks are composed of frictioned Sea Island cotton fabric, three thicknesses of



which are built up to form the cushion. These are attached to the spiders by bolts and nuts, washers being provided to prevent tearing during adjustment. The strength of the superposed layers, their threads at different angles, combined with their flexibility, makes a coupling which is economical to assemble, eliminates back-lash, requires no lubrication, is not affected by water nor oil, prevents the transmission of shocks and sounds, and is frictionless. It has been adopted, or is being tested, by many prominent engineers and factories in this country and abroad. [Thermoid Rubber Co., Trenton, New Jersey.]



RUBBER-COATED ADHESIVE PLASTER.

Rubber in a plaster for surgical uses adds to its adhesiveness. A rubber-coated zinc oxide plaster which sticks and stays stuck, and which, besides its surgical use, can be used for repairing articles of glass, china, cloth, wood, rubber tires, hose, etc., is now put up in various widths and lengths, in attractive metal boxes. [Bauer & Black, Chicago, Illinois.]

HAT "SWEAT" BAND WITH RUBBER DISKS

For purposes of ventilation it is necessary that some means be provided so that the inner band of a man's hat, known as the "sweat band," will not come in too close contact with the head. Some sweat bands contain projections which form corrugations, unpleasant in sensation and exerting injurious pressure on the head of the wearer. Also, they do not materially assist in maintaining the hat on the head.



In the improved method here shown, thin rubber disks, or buttons, are fitted into holes about the size of a 10-cent piece made in the leather band. These rubber buttons when inserted form a perfectly smooth surface, but each button has a flange which keeps it from coming through the band and a humped back which throws it forward when the hat comes in contact with the head. As it permits a comfortable, natural position of the hat and free passage of blood through the scalp, the headaches so apt to be produced by ill-fitting hats are avoided, and it is claimed also to prevent baldness. [Robert H. Holmes, New York City.]

GOODRICH RUBBER BLANKET AND APRON.

Many a good suit has been ruined when a motor ride is interrupted by accident or injury to the mechanism underneath the car, rendering necessary the "get out and get under" process cele-



brated in song, to discover and remedy the trouble. A rubber blanket which, unlike many others, is not at all cumbersome, but can be folded into a small, compact package and carried easily under the car seat or in the tool box, is a suit saver, and perchance a life saver, if the ground be of a moist variety. This is also an excellent camping blanket, and, in fact, its uses are manifold and its disadvantages nil.



The rubber apron for garage workers, also illustrated, completely envelops the wearer from neck to heels, thus affording the thorough protection particularly desired when washing the cars. For the uncleanly operations of vulcanizing tires, repairing automobile parts, etc., this ample covering is also highly useful, and it is claimed to be made of an excellent grade of rubber. [The B. F. Goodrich Co., Akron, Ohio.]

STYLES IN WATERPROOF GARMENTS

The three silk and rubber wraps here illustrated show the transition from summer to winter styles. The fabric used for the first two garments, appropriately named after the water nymph "Undine," is the result of a newly patented Scotch

process, the material being specially dyed, treated and rubberized. The color combinations and patterns furnished in the "Undine" fabric are exceptional—hand some—plain colors in all the newest sport shades, as well as plaids, checks and stripes, the material being double-faced or satin-faced, as desired for the individual garment.

The upper garment is a wonderful shade of rose pink, the box-plaited collar, and the edging on the shoulder cape and around the lower edge, lending the softening, becoming touch sought by feminine buyers.

As the days grow colder and autumn winds begin to blow, a closer fitting wrap is

more in demand, and the coat hat and bag shown in the lower



illustration form a most attractive fall outfit for walking or automobiling. [Lewis & Bettinson, New York City.]

A stunning model imported by the "Dry Goods Economist,"

also shown, may be suitably worn when the snow flies. The coat and hat are of blue rubber, trimmed with rows of stitching and seal fur.

THE "SILVERTOWN" VALISE-TENT

The illustration shows a rubber-proofed outfit of decided utility, intended primarily for the use of officers in active service. It is thoroughly practical and designed not only to keep out rain, but to be impermeable even when resting in a pool of water. The material is rubber-proofed on the outside, so there is no absorption of water and consequent increase in weight. The valise weighs only 14 pounds, has no loose parts to get misplaced or lost, and is an exceptionally portable contrivance. It has a piece of strong canvas underneath, which forms the



attached to the canvas, eyelet holes being provided along the two sides for interlacing, if desired.

In two or three minutes it can be made into a comfortable tent, or it can be used as an ordinary ground sheet. The illustration shows the valise erected as a tent. The flap marked *A* is a continuation of the top and sides and, when extended, shields the opening from driving rain. The flap marked *B* is a continuation of the bottom and sides and can be raised so that no water can possibly enter through the opening. Inside may be seen the roomy pocket in which the kit may be placed and used as a pillow. The dimensions of the tent, when erected, not including extension flaps, are as follows: Length, 6 feet 6 inches; width, 2 feet 3 inches; height, at top end, 2 feet 3 inches. [The India Rubber, Gutta Percha & Telegraph Works Co., Limited, Silvertown, London, England.]

THE NEW CRAVENETTE FINISH

The Cravenette Co. of New York has recently entered the field of broad silks and silk mixed fabrics of every description, with an entirely new finish. It is called "Cravenette Finish" and imparts permanent water-resistant and spot-proof properties to the fiber of the silk, so that a garment is insured against the damaging effects of water.

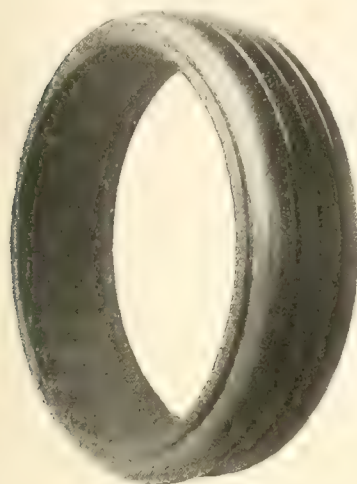
The feature most interesting to the rubber trade is the application of this finish to the goods after they have been rubberized, including silks, crêpe de chînes, wool, cotton and all other single or double texture fabrics used in the manufacture of rubberized goods. Thus the exposed portions of the garment or article are rendered water-repellant and spot-proof; the linings of ladies' silk rubberized garments are therefore immune from water spotting and single or double texture raincoats of wool, or wool and cotton, will not become water soaked.

It is noteworthy that this finish in no way affects the rubber or the fabric and by reason of the added water-resistant qualities the fabric will last and the garment preserve its appearance for a much longer time than ordinarily. Moreover, if for any reason the seams should separate and water come in contact with the lining, it will be unnoticed as the absorption is prevented by the special finish.

The Cravenette Finish department of the Cravenette company is located at Mount Vernon, New York, where the factory capacity at the present time is about 3,000,000 yards per year.

FIRESTONE "GIANT" SOLID RUBBER TIRES.

There are certain conditions of service under which a single solid tire is superior to two tires fitted as twins on wheels of heavy motor trucks.



The Firestone Tire & Rubber Co., Akron, Ohio, is selling "Giant" single tread solid rubber tires in 8-inch, 10-inch and 12-inch sizes.

These massive single tread tires have deep grooves in the tread to provide against side-slipping and are said to be as near pneumatic resiliency as can be produced in solid tire form.

It is claimed that this construction gives a greatly increased rubber cushion under the load, with a saving in weight in rim parts. Their very appearance certainly suggests strength and durability.

It is understood that the 8-inch "Giant" is considered as an oversize for 4-inch and equal to 5-inch twin tires, the 10-inch being oversize for 5-inch and equal to 6-inch twins, while the 12-inch "Giant" is oversize for 6-inch and equal to 7-inch twins.

These large tires are said to present a great advantage in uniformity of wear. They adjust themselves to the unevennesses of the road, and are built with a broad base to insure better traction when the vehicle has a tendency to skid. The manufacturers anticipate that this form of tire will come rapidly into wider use. [Firestone Tire & Rubber Co., Akron, Ohio.]

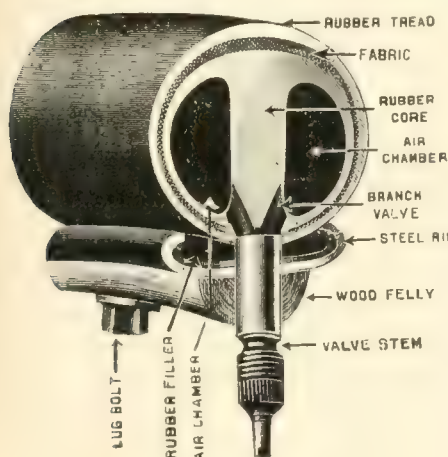
THE FEAR-NAUGHT TUBELESS TIRE.

This is a tubeless pneumatic tire that seems to be immune from many of the troubles that threaten the pneumatic tire of ordinary construction. It is said to be proof against blow-outs, due to the sturdy character of the casing, and liability to puncture is greatly minimized by the unusual thickness of the tread. Moreover, should a puncture actually occur, the tire will continue to carry the load without rim cutting, as it is non-collapsible.

It is really a single tube tire divided in the center by an annular rib of rubber, forming two continuous air chambers that

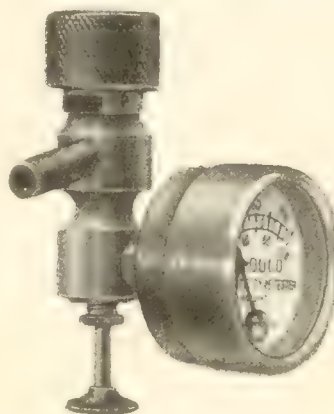
are inflated through an air valve of the ordinary type that opens into both chambers. Only one-half of the air pressure required for an average tire is recommended for this one. It is without beads, attachment to the rim being made by eight threaded lugs that are vulcanized in the tire. These pass through the rim and when the nuts are tightened the tire is securely held in place against a rubber liner of annular

form that occupies the bead space in the rim. They are made in all sizes to fit clincher and quick demountable rims. The Department of Militia and Defence of Canada has tested these tires with the view of adopting them for military use. The prototype of this tire was illustrated and described in THE INDIA RUBBER WORLD, February 1, 1904. [Fear-Naught Tire Co., Paterson, New Jersey.]



THE DUCO PNEUMATIC TIRE GAGE.

This new English device possesses some novel advantages that will appeal at once to the motorist who realizes the importance of keeping his tires properly inflated. It is, in fact, a combined air pump connection and pressure gage.



It is used in the following manner: The wheel is turned so that the tire valve occupies the highest possible point, the valve stem, therefore, extending downward. The upper part of the device is then slipped over the stem and the air turned on. While the tire is being inflated the air does not come in contact at all with the gage. When it is desired to know if the tire is fully inflated, a valve is operated by pressing the button at the end

of the valve stem and the pressure of air in the tire is immediately shown by a hand that points to the figures on the dial gage, indicating the tire pressure. Upon removing the hand pressure from the button the air is at once diverted from the gage and passes directly into the tire. [Brown Brothers, London, England.]

METHOD OF DETERMINING AIR PRESSURE IN TIRES.

Many tires that pass on to the scrap heap are prematurely and needlessly worn out through under-inflation. The amount of air necessary to carry will depend upon the amount of work that is to be done and the load carried. The following method for determining the correct air pressure for different loads is suggested by the Fisk Rubber Co.:

The motorist should determine the load for each tire and regulate his air pressure to carry that load without injury to the tire. To do this, weigh front and rear of the loaded car separately, and divide by two, which will give the weight carried on each wheel.

Now that the weight of load carried by each wheel is known, determine the air pressure by using the factor given opposite the tire size to divide the amount of the load, the result being the pressure required:

3-inch tire	Divide weight of load by 8
3½-inch tire	Divide weight of load by 10
4-inch tire	Divide weight of load by 12
4½-inch tire	Divide weight of load by 14
5-inch tire	Divide weight of load by 16
5½-inch tire	Divide weight of load by 18

Example.—On a 4-inch tire you find the load to be 720 pounds. Refer to above table and note that on a 4-inch tire 12 is the factor: 720 pounds divided by 12 equals 60, therefore inflate the tire to 60 pounds air pressure.

As the load carried by the front tires is usually less than on the rear, by using the method as suggested, it will be determined that less air pressure is needed. The ideal load for the best all around results under average conditions is as follows:

3-inch tires	400 pounds
3½-inch tires	550 pounds
4-inch tires	735 pounds
4½-inch tires	960 pounds
5-inch tires	1,210 pounds
5½-inch tires	1,485 pounds

A load heavier than these figures may be carried, but the resulting pressure necessary to get good tire mileage is usually very hard on the car and its occupants. To obtain best results weigh car as suggested, divide any load by figure given and inflate to that amount; test air pressure at least once a week.

THE EDITOR'S BOOK TABLE.

SIERRA LEONE: ITS PEOPLE, PRODUCTS AND SECRET SOCIETIES. By H. Osman Newland, F. R. Hist. S., F. I. D. [John Bale, Sons & Danielsson, Limited, London, England. 16mo, illustrated. 240 pages. Price 7/- net.]

THIS book is more than a guide book, for while it contains a large amount of information regarding Sierra Leone, it is also a personal narrative of the author's experiences during his travels in that country, which being told in a somewhat chatty way, imparts much of this information in a most entertaining style. One chapter is devoted to life on a rubber plantation, and as the author is director of the Peneiro Rubber Estates, Limited, he speaks from experience and with authority. According to the book, the estate visited covers about 3,500 acres, about 18 miles out, on the railroad which runs from Freetown into the interior. *Hevea* rubber has been planted, while *Manihot* or *Ceara* rubber trees were growing wild—the result of former plantings—when the present company took possession. Mr. Newland mentions also the *Castilloa* and the *Funtumia elastica*, explaining the comparative values of these as rubber producers, showing the way in which the latex is secured from the different varieties, and giving various hints valuable for prospective planters in equatorial Africa.

A postscript consisting of more than 40 pages, is contributed by H. Hamel Smith, editor of "Tropical Life," this being devoted mainly to practical planting notes for Sierra Leone and West Africa. Regarding the cultivation of the *Hevea Brasiliensis* he says, "Trees that have been planted are too young at present for me to be able to say definitely whether they will prove a commercial success. All I can say is that they are growing well." In Mr. Smith's postscript are directions for the laying out of an estate; an article on moisture conservation, and directions for cultivating cacao and ground nuts. This is followed by an appendix giving some laws for the guidance of traders. The publishers state that if there is sufficient demand, the book will be issued annually, or biennially, with amendments and additions to date, as the "Sierra Leone Year Book," and with it, a Who's Who section.

IMPORTER'S DIRECTORY OF THE NETHERLANDS EAST INDIES. Published by the Division of Industry and Commerce of the Department of Agriculture, Industry and Commerce, Buitenzorg, Java. [4to, 98 pages. Paper bound.]

It certainly shows that the Dutch Government in the East Indies appreciates the value of publicity to increase foreign trade, when it publishes a directory in English to furnish information to merchants and manufacturers who wish to open trade relations with the local tradesmen. The book is a valuable one, inasmuch as it gives, in well arranged and classified form, the names and addresses of mercantile houses in Borneo, Sumatra, Java, Celebes and the smaller islands of the Dutch East Indies. The rubber trade, of course, is well represented.

NEW TRADE PUBLICATIONS.

ON the cover of a 48-page vest pocket booklet issued by the Dominion Rubber System, the alliterative caption "Foot Facts" and the Dominion seal stand out prominently in red and white against a background printed to simulate leather. The booklet contains practical information concerning care of the feet and of rubber footwear, and the story of the discovery of rubber and its uses, written in an entertaining, popular style with humorous illustrations. There are various data regarding postage, population and other Canadian matters, tables of measurement, a calendar for 1916 to 1918, etc., interspersed with which are advertisements of Dominion rubber footwear, while a number of blank pages afford space for personal memoranda.

* * *

A little advertising card, which includes a blank for using as a post-card in ordering, is sent out by the M & M Manu-

facturing Co., Akron, Ohio, to describe its inner tube splicers, showing the construction of these little accessories for the tire repairer and the method of using them.

* * *

The Link-Belt Co., Chicago, Illinois, in its latest "Silent Chain Bulletin," calls special attention to its casings for silent chain drives, giving full description, with diagrams and photographs of the casings themselves, and the means taken to render them dust-tight, oil-tight and accident-proof, points of interest to users of power transmission.

* * *

The B. F. Goodrich Co., Akron, Ohio, is sending out a compact little pamphlet entitled "Supporting the Chief," to call attention to its various lines of fire hose, solid tires for fire trucks, pneumatic tires for fire chiefs' automobiles, and also firemen's coats and "Hi-Press" footwear. The booklet is one which will be appreciated by members of fire departments, not only because of the reading matter, but also for the fine illustrations of fire apparatus and firemen in action.

* * *

No. 2 of "Extra Service," a little paper published monthly for free distribution among employes of The Federal Rubber Co., Cudahy, Wisconsin, has been received. It contains news and gossip of the factory, pithy sayings and a large amount of bright matter, interesting to its readers.

* * *

We are in receipt of the first issue of "Miller Talk," a house organ which the Miller Rubber Co., Akron, Ohio, intends to publish monthly. This maiden number is an eight-page leaflet printed on smooth-finished buff paper. The title page is adorned with a picture of the Miller factory buildings and three broadly smiling cartoon figures with hands at ears, typifying the policy of the paper announced further down the page as "A big ear for all the gossip of the shop and a cheerful tongue to pass along the best of it." It is a friendly, chatty little sheet concerning the doings of Miller employes, with good illustrations, cartoons and jokes.

* * *

The motor tire price list of Wood-Milne, Limited, Preston, England, shows some handsome illustrations of new treads of these well-known, English tires; also a description and illustration of the Wood-Milne patent pump for inflating tires, a small, compact machine weighing but a few pounds and contained in a box about 5 by 12 inches. The book contains code words for ordering and full price lists of all the various sizes of tires, the American sizes being listed separately for convenience. A supplementary catalog gives a list of solid band tires made by the same company.

* * *

Henley's Telegraph Works Co., Limited, London, England, has sent out a new price list of electric cables and wires, insulated with vulcanized and unvulcanized india rubber. It is a comprehensive work of over 100 pages, giving full descriptions and specifications of the many lines of cables, bell wires and flexible cords, and jointing materials made by this concern. A description is given of the Henley wiring system, the method of running electric wires on the surfaces of walls, and other matter of interest to users of cables and electric conductors.

* * *

The India Rubber, Gutta Percha & Telegraph Works Co., Limited, London, England, has sent out various price lists in uniform size, that they may be secured in the convenient binder furnished by this company. There have recently been received from this concern individual price lists of mechanical and general rubber goods; rubber gloves, gauntlets and mitts; matting; vulcanized fiber; waterproof fabrics; confectionery molds; balata belting and cycle tires. Each of these is well printed, and in

most the various articles comprised are illustrated, these illustrations being mainly finely engraved half-tones, while many of the lists contain matter descriptive of the manufacture, quality and use of the articles. This company is also sending out small pamphlet price lists of its various lines of automobile and truck tires.

* * *

A new semi-monthly journal entitled "Aviation and Aeronautical Engineering" is now being published by the Gardner, Moffat Co., Inc., New York City. It is a handsomely illustrated and finely printed magazine, very largely devoted to the theoretical, technical and mechanical problems of aeronautics, and contains papers by well-known engineers in this comparatively new science. The technical editor is A. Klemm, A.C.G.I., B.Sc., S.M.; the managing editor, Herbert M. Williams, B.S., and the military editor, Philip J. Roosevelt. Undoubtedly this journal will fill a special niche, and will find a clientele of its own in the line of aviation.

RUBBER TRADE INQUIRIES.

THE inquiries that follow have already been answered; nevertheless they are of interest, not only in showing the needs of the trade, but because of the possibility that additional information may be furnished by those who read them. The editor is therefore glad to have those interested communicate with him.

[217.] Inquiry has been received for names of rubber brokers with offices at San Francisco, California, or Seattle, Washington.

[218.] The names of firms making tissue paper transfers for marking inner tubes are requested.

[219.] Manufacturers of inner tube skiving machines are sought.

[220.] Names of concerns specializing in the manufacture of aluminum cups used in tapping rubber are requested.

[221.] A request has been received for names of firms supplying Dichlorethylene.

[222.] We are in receipt of an inquiry for vulcanizing accelerators.

[223.] A correspondent wishes to know where he can secure cotton linters for use in rubber shoe soles, and the fluffy fibrous waste that results from buffing automobile tires.

[224.] A correspondent wishes to know where he can secure a copy of "Dives' Plain Talks on Rubber."

[225.] Addresses of concerns making ivory or celluloid parts for "pacifiers," also the gelatine or jelly filling, are requested.

[226.] We have been asked who manufactures the Grieve Inflatable Waistcoat.

[227.] Addresses are requested of rubber companies making a business of selling stock to manufacturers of automobile tires, calendered and ready for use.

TRADE OPPORTUNITIES FROM CONSULAR REPORTS.

A firm in the Netherlands desires to communicate with American manufacturers and exporters of fancy rubber articles. Report No. 22,426.

A business man from Spain, now in the United States, wishes to enter into commercial relations with American manufacturers of rubber goods. Report No. 22,458.

DRAWBACK ALLOWANCES.

The following are the amounts and names of concerns to which the Treasury Department of the United States has paid drawback allowances on exported goods relating to rubber, manufactured in whole or in part from goods previously imported into this country:

COTTON WATERPROOF CLOTH: J. L. Multy Co., \$75.02; C. Stohns Sons, Inc., \$682.48; Blumenthal & Co., \$794.68, due \$72.17; Garner Print Works & Bleachery, due \$96.67; Rigby Waterproofing Co., \$2,885.05; Stowe & Woodward Co., due \$10.69.

WOOL WATERPROOF CLOTH: Commonwealth Manufacturing Co., \$1,093.40; Cravenette Co. of New York, \$5,087.79; Einstein Manufacturing Co., \$4,063.61; Firth & Foster, \$367.51; London Shrinking & Finishing Works, \$28.07; Manhattan Manufacturing Co., \$318.94; Julius Kallman Co., \$11.43; Bradford Dyeing Association, \$5.20; Kennedy & Britt, \$214.14.

JUDICIAL DECISIONS

DICKSON & CO., LIMITED, vs. DEVITT. Messrs. Dickson & Co., Limited, were the agents in London of the Third Mile (Federated Malay States) Rubber Co., Limited, which had bought rubber washing machinery in England to be shipped to Singapore. On November 8, 1915, Messrs. Dickson instructed the defendant to "insure, marine and war risks, machinery to the value of £500 [\$2,433] despatched for shipment to-day per steamer 'Suwa Maru' or other steamers, London to Port Dickson." The defendant effected an insurance on the machinery against marine risks per "Suwa Maru" or steamers from London to Port Dickson, but by some mistake only effected an insurance on the machinery against war risks per "Suwa Maru." The machinery was not taken by the "Suwa Maru," but on December 9 was shipped in the "Yasaka Maru," which was torpedoed in the Mediterranean Sea, and the goods were lost. The plaintiffs were unable to recover on the policy against war risks because that policy only insured the goods per the "Suwa Maru." They therefore brought action against the insurance broker Devitt, alleging that through his negligence and breach of duty they had been unable to recover the loss of £500 under the policy, and they claimed that sum.

The British Court held that a client was entitled to rely on a broker carrying out his instructions to insure, and that the client was not, as between himself and the broker, bound to see whether those instructions had been carried out and to look at the documents himself. If the policy had been in accordance with their instructions the plaintiffs would have been covered, but as it was not in accordance with those instructions they were not covered, and, therefore, the loss must fall upon the defendant.

FABRIC FIRE HOSE CO. v. TOWN OF CADDO AND OTHERS. This was an action for material furnished to a municipal corporation. The Supreme Court of Oklahoma held that where a plaintiff sues upon a claim against a municipality for material furnished, and proves his contract and delivery of the material to the municipality, and that the debt therefor is due and unpaid, he makes a *prima facie* case, and the burden of the proof is then upon the municipality to establish that the debt was illegally contracted. [The Pacific Reporter, Vol. 158, page 350.]

CONSOLIDATED RUBBER TIRE CO. AND OTHERS v. DIAMOND RUBBER CO. OF NEW YORK. This case, relating to the Grant tire patent, was the subject of an article in THE INDIA RUBBER WORLD for May, 1916. The Circuit Court of Appeals, in New York City, held that where a defendant has deliberately and persistently infringed a patent, even after its validity was established, any doubts as to the amount of damages for which it is liable will be resolved against it. That, in finding an established license fee under a patent as a basis for computing damages for infringement, the law does not require that all license fees should have been for exactly the same amount at all times. Approximately \$210,000 damages were awarded to the plaintiffs. [The Federal Reporter, Vol. 232, pages 475, 508.]

A guarantee of 4,000 miles of service is now furnished with "Tyrian" tires, manufactured by the Tyer Rubber Co., Andover, Massachusetts, together with direct factory service to customers located near the factory. This company invites automobilists to visit the factory and inspect the manufacture of these tires.

Interesting Letters from Our Readers.

RUBBER AND THE BARKLEY BILL.

TO THE EDITOR OF THE INDIA RUBBER WORLD:

DEAR SIR—The Barkley bill imposing penalties upon those who misbracket goods may have its merits. While it appears to be a drastic measure which would make amenable and probably hamper certain rubber manufacturers who employ the words "pure gum," "pure rubber" or "pure Para" to describe their products as well as those who claim that their goods are "all rubber," or "contain nothing but pure rubber," still its equity of principle cannot be denied. It is admittedly difficult to frame any law incapable of imposing hardship upon some one, and so with the Barkley bill, yet it will surely prove of greater potential benefit than injury to the rubber business as a whole, tending to eradicate extravagant, indefinite and false statement and leading the way toward an accurately descriptive nomenclature.

Every rubber expert knows that substances other than rubber itself are essential to the production of rubber articles of every sort, the gum being virtually useless in a pure state. Just as an alloy of copper and zinc gives us brass, having important characteristics not possessed by either constituent metal, so rubber compounds contain legitimate ingredients other than pure rubber which impart desirable qualities not inherent in the gum alone. There is nothing about this to conceal and business foresight should have counseled against the use of catch phrases that might seem to do so, whatever the actuating motive. Certainly the enactment of the proposed law will in no wise damage manufacturers of honest goods; their reputation and popularity of product cannot suffer as a result of truthful statement in their own or competing publicity.

The rubber business is by no means exceptional in that some of its nomenclature is misleading. The term "solid gold," for instance, intended primarily to distinguish between gold plate and metal of uniform consistency throughout, is well known to infer part alloy introduced in small proportion to increase the durability of jewelry, and in larger proportion to cheapen it. Almost invariably, though, the term is qualified by the marking 10k., 14k., 18k., etc. This informs the purchaser what he should receive and places the matter on a definite basis subject to expert analysis so that failure of jewelry to measure up to the indicated standard constitutes an actionable case of misrepresentation. By comparison the notably lax terms of the furniture trade seem obviously dissembling. "Mahogany," for example, means mahogany veneer, not "solid mahogany," according to common usage. This may be the truth, but it is not the whole truth. But furniture manufacturers are awaking to the necessity of reform, and with the aid of their trade papers are now attempting to abolish the misuse of the phrase "American quartered oak" as so frequently applied to furniture which is neither American in spirit nor quartered oak in fact.

It is chiefly against such flagrant misrepresentations that the war of truth in advertising is now being waged so assiduously by the Associated Advertising Clubs of the World. Business acumen calls upon every conscientious advertiser to lend his hearty support to this movement. Indeed, the time is at hand when it behooves the advertisers in every kind of industry to restrain by concerted action those who use the legitimate parlance of the trade falsely with fraudulent intent, and to purge the trade vocabulary of all inadequate terms, not only those inexact phrases which may mislead the public harmlessly, but those fine sounding yet indefinite phrases with which unscrupulous manufacturers may cloak a multitude of sins or take ad-

vantage of conscientious competitors in dealing with poorly informed persons.

Happily the primary object of the loose terms common to the rubber trade has not been to deceive, although in certain instances they may have been resorted to in an attempt to distinguish between honest goods and those containing adulterants or made with scrap rather than new rubber. For the most part they have been adopted in response to the spirit of the times and as a direct outgrowth of pure food laws and advertising campaigns and their effect upon other lines of goods. The mistake has been in ignoring the fundamental fact that all rubber products are fashioned out of rubber compounds rather than pure gum. To infer anything otherwise courts distrust among those hundreds of thousands of intelligent persons who know something about the making of rubber goods, even though in a very general way; also it is unfair to those conscientious manufacturers who prefer to tell the strict truth even if not the whole truth.

It might be argued that if any article has the desired appearance, serves the intended purpose and possesses reasonable durability it does not really matter whether it be composed of pure rubber or what not, but this is beside the question. The same might be said of a diamond ring. The purchaser is entitled to know what he is buying and to receive an article equivalent in value to the price paid. There is no adequate reason for any misleading statement about it whatever, whether it be made in good faith or otherwise. To countenance inaccurate descriptive phrases and permit them to become the so-called technical terms of the trade is a grave mistake that will eventually redound to the detriment of any business. Were rubber publicity of this character directed solely to the trade, the issue would not be of serious moment, but instead it makes its appeal to the public at large. And this explains its very existence, for addressing such inaccurate phrases to the trade would manifestly be an insult to expert knowledge.

Viewed from every angle the Barkley bill offers a potent instrument with which to accomplish much permanent good in the rubber business as well as elsewhere, and its enactment should be welcomed by progressive men of integrity and foresight who seek to build reputations for the future as well as fortunes for the present.

TRADE CRITIC.

OUTSIDE HELP FOR RUBBER MILL ENGINEERS.

TO THE EDITOR OF THE INDIA RUBBER WORLD:

DEAR SIR—The rubber industry, like any of the other great industries of modern development, has had to create its own tools and methods of manufacture, rather than find them ready made to hand. The mechanical engineer of the average plant is the hardest worked man in the whole outfit; at least it would seem so, and if you ask him he will probably admit it himself. Usually a machine shop of very elaborate proportions is attached to all important plants, and the production of special machinery suited to the needs of the plant is an important factor in its organization. Inventive ability and technical ability of all sorts are employed and liberally paid. A way must be found leading out of all kinds of difficulties. The success of the plant is largely dependent upon the ingenuity and resourcefulness of the engineers working in its mechanical department, assisted by a corps of able helpers, and having at their beck and call all kinds of apparatus and facilities for experiment.

Very little study or interest has been given to the troubles and problems of the mill engineer by the average machine shop, outside the walls of these plants, except in some few notable cases where independent machine shops doing general work have really taken a leading part in the production of improved machinery useful in the rubber industry. In the average case the mechanical engineer has the whole burden of the development of labor-saving machines. Machine builders as a rule have been content to follow, rather than lead, and have contributed very little towards the special equipment required in building up their industry. Cases where any creative work in the line of special machine design has been undertaken voluntarily and on the sole initiative of the outside shop, are unfortunately far too few.

The mill engineer welcomes assistance, and does everything to encourage it, but the average machine shop for general work waits to be told what to do and how to do it, rather than buck up and give the mill engineer a helping hand.

The doctrine of coöperation is the only sound one in industrial development. The average plant producing rubber goods is strong financially, and is willing to pay handsomely for the proper sort of coöperation from outside sources in solving its problems. When an industry devoted to the production of rubber goods is obliged practically to go into the machinery business, just so much of its energy, thought and genius as it bestows on the machinery business are lost to the rubber business. The machinery business is the business of machinists. Mechanical problems are naturally the problems with which the machinery business should cope, rather than leave their solution to the skill and ability of engineers in other lines.

Of course it is not possible for machine builders to foresee and to provide for all kinds of contingencies arising in the constantly varying requirements, and new requirements, in the production of rubber goods. It is not too much to ask, however, that a little more "pep" and "punch" be put into the efforts of machine designers outside of the rubber plants. It is not too much to expect the experienced machinery houses to bring out labor-saving machinery which would go the mill engineer "one better." The mill engineer is only too willing to pin a medal on the successful designer, and leave the honors to the machinery trade, if only he can get from it the help he needs and is willing to encourage liberally.

THE CAMERON MACHINE CO.

Brooklyn, New York, September 20, 1916.

[THE INDIA RUBBER WORLD has always made a point of encouraging coöperation between machine builders and the trades employing machinery. Its columns are always open to machine builders who have produced something useful to the rubber trade. In fact we write hundreds of letters each year inviting producers of new machines to bring them before the trade through our columns.

The products of the Cameron Machine Co. are cases in point. The Cameron principle, the "Score Cut," appealed to us at once and that is why we have so willingly given space to the various Cameron slitting machines. Although it is perhaps not necessary, we assure them, or any other producer of rubber working machines or devices, that our columns are open to them provided, of course, that their products are of value to the rubber trade.—THE EDITOR.]

RUBBER MEN JOIN QUESTION CLUB

The Question Club is a unique and highly exclusive organization which carefully preserves the secret of its name, purposes, and qualifications for membership. Organized 12 years ago with five members, five new members have been added to the roll, each year since, in every case men of power in their respective callings. Two of the five enjoying the honor of election this year are Charles McCullough, of the Pennsylvania Rubber Co., Jeannette, Pennsylvania, and William J. Lamb, of the Fisk Rubber Co., Chicopee Falls, Massachusetts.

FROM A RUSSIAN PRISON CAMP.

THAT THE INDIA RUBBER WORLD is considered the headquarters for all facts pertaining to the rubber industry was brought vividly to mind recently by the receipt of a postal card from a captured German soldier in a Russian prison camp. The card is here reproduced photographically, both the face and back. The face shows the address, and also the permit or "frank" (in Russian and French) to allow it to go through the mails free of postage because sent by a prisoner of war. The message on the back has been allowed to go forward, after the censor has erased the name of the firm, presumably a German one and obliterated



ПОЧТОВАЯ КАРТОЧКА, ЛОРЕАНТО

Почта. БоеннонныMaker Jahr,
Für die Prisonniers de guerre

To the office of the
India Rubber World
New York City
U S A
Commercial -
Buildings

Gorbatow, 15 Juni 1916

Vor Ausbruch des Krieges stand ich in Unterhandlung mit Hr. Geo. D. Levysohn, so einer der führenden Männer einer

Firma. Ich wäre Ihnen nun dankbar, wenn Sie mir die Firma mitteilen wollten, da es gehört. Ihre Anwesenheit kann ich Ihnen erst nach Beendigung des Krieges anzeigen. Da ich jetzt Kriegsgefangener in Russland bin, korrespondiere nur deutsch oder französisch. Ich habe keine Adresse (sonst) Hochachtungsvoll
BoennoninnyMaker Jahr,
Topdamobekara, Zeuckaa Annaka, Topdamobr, Russia.

Max Hack

Krusen, 1916

A CENSORED POSTAL CARD FROM RUSSIA.

with dense black ink a portion of the address at the bottom. A translation of the message is as follows:

"Gorbatow, June 15, 1916. Prior to the outbreak of the war I was in communication with Mr. Geo. D. Levysohn, one of the executives of—(erased by censor)—. I would be very thankful to you if you would inform me of the name of the firm with which he is now connected. I can compensate you for your trouble only after the end of the war, for I am now a war prisoner in Russia. Correspondence is only allowed in German and French. Respectfully yours, Max Hack.

My address is (in Russian), Boennoninny Maker Jahr, Topdamobekara, Zeuckaa Annaka, Topdamobr, Russia."

The card is interesting as a side-light on the censorship of the mails since the war began.

Contract has been made for the first unit of the tire factory of the International India Rubber Corporation at South Bend, Indiana, mentioned in the July issue of THE INDIA RUBBER WORLD. The dimensions of the building will be 382 by 80 feet, and it will cover 28,700 square feet of floor space.

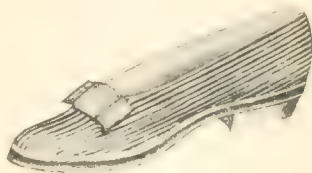
TENNIS SHOES FOR SUMMER OF 1917.

The manufacturers of rubber soled, canvas upper footwear, variously designated as sneakers, tennis shoes, sport shoes, etc., and "Keds" (the new name), publish their price lists for the summer season early in the fall previous, generally about September 1. On that date the United States Rubber Co. sent out its net price list, as did also the Canadian Consolidated Rubber Co., Limited, and soon after most of the other manufacturers issued lists which closely approximated in prices those of the previously mentioned companies.

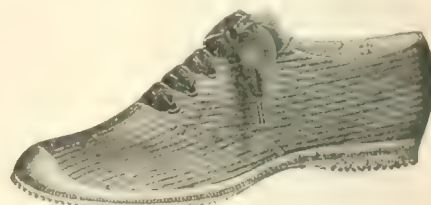
There had been some apprehension on the part of customers that the new prices would show a heavy advance. Crude rubber prices had changed somewhat from those of a year ago, although



WOMEN'S PARADE PUMP OF WHITE DUCK, WITH HEEL.
UNITED STATES RUBBER CO.



PARIS PUMP OF GRAY STRIPE FABRIC.
APSLEY RUBBER CO.



YACHTING OXFORD OF BROWN STRIPE FABRIC.
APSLEY RUBBER CO.

the higher cost of Brazilian varieties was practically offset by lesser values for plantations. But practically every other material which entered into the manufacture of these shoes has enhanced in value, while labor costs are quite a little higher than a year ago. There was considerable surprise manifested, therefore, when the conservative advance in prices was noted; none of these over 10 cents a pair, some of them less, while a few were continued at the same prices as a year ago.

Last year several companies introduced lines of rubber-soled canvas shoes without the rubber foxing. These simulated welt-sewed shoes, and were generally designated as welts, or of "welt construction." The popularity of these lines has been such that the manufacturers are preparing for much larger sales the coming season. These shoes cost somewhat more to manufacture, and the prices range from 10 to 20 cents a pair more than similar shoes of the older construction.

There is a noticeable increase in the number of lines of shoes with full heels. Manufacturers have found it necessary to place stiffeners, of metal or fiber, in the shanks of these to insure against discomfort to the wearers.

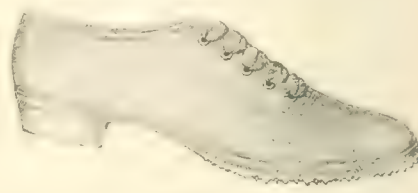
In no particular has the improvement in



ROTARY OXFORD, WITH WELT AND FULL HEEL, WHITE DUCK AND WHITE SOLE. UNITED STATES RUBBER CO.



WOMEN'S HIGH CUT QUARTER DUCK, BAL OF PALMETTO DUCK.
UNITED STATES RUBBER CO.



UNIVERSAL OXFORD, WHITE DUCK, GRAY SOLE, NARROW FOXING, FULL HEEL, UNITED STATES RUBBER CO.

tennis lines been more manifest than in the matter of lasts. But a few years ago there was practically but one shape of toe. Now there are wide and narrow toes, straight and nature-shaped lasts, while the better fitting of the material to the lasts, and the addition of leather reinforcements of seams, make to-day's tennis lines as trim and stylish as the products of manufacturers of fine leather shoes.

A new name has been invented for this style of footwear. It is "Keds." This word is to be used in place of "tennis" or

"tennis shoes" by the United States Rubber Co., to identify its lines, in contradistinction with similar goods of other makes. This word is the keystone of a most comprehensive campaign of advertising to the consumer trade. Incidentally, it may be stated that the company will run a similar campaign to popularize its raincoats under the newly-coined word of "Raynsters."

The United States Rubber Co.'s catalog and price list of sporting and tennis shoes for the season of 1916-17 is a pamphlet of 36 pages showing in neat half-tones the many lines of canvas upper, rubber-soled shoes made by this company. Each page is devoted to a special line and is ornamented with a blue border having the word "Keds" at the top and a picture at the bottom appropriate to the line shown on the page. The changes in prices on United States Rubber Co.'s tennis goods are as follows:

		ADVANCE PRICES.			
		1915-1916.	1916-1917.	1915-1916.	1916-1917.
Men's Rotary Bals.	..	\$1.60	\$1.70	Boys' Week-end Oxford	\$0.95 \$1.00
Men's Rotary Oxford..	1.45	1.55		'Youths' Week-end Oxford	.90 .90
Women's Rotary Bals..	1.40	1.50		Men's Bathing Shoes...	.45 .47
Women's Rotary Oxford	1.25	1.35		Boys' Bathing Shoes...	.40 .42
Men's Bonair Bals....	1.40	1.50		Youths' Bathing Shoes...	.37 .39
Men's Bonair Oxford...	1.25	1.35		Women's Bathing Shoes	.37 .39
Women's Bonair Bals...	1.25	1.35		Misses' Bathing Shoes...	.37 .39
Women's Bonair Oxford	1.10	1.20		Children's Bathing Shoes	.32 .34
Men's Week-end Bals...	1.10	1.20		Women's Bathing Shoes, High Cut	.58 .57
Women's Week-end Bals	1.00	1.05			
Boys' Week-end Bals...	1.05	1.10			
'Youths' Week-end Bals	1.00	1.00			
Men's Week-end Oxford	1.00	1.10			
Women's Week-end Oxford	.90	.95			
		LOWER PRICES.			
		1915-1916.	1916-1917.	1915-1916.	1916-1917.
Boys' Champion Bals, Black Sole	.....	\$0.63	\$0.60	Boys' Champion Bals, Gray Sole	.....\$0.68 \$0.65
Youths' Champion Bals, Black Sole	.....	.60	.57	Boys' Champion Oxford, Gray Sole	......58 .55
Boys' Champion Oxford, Black Sole	.....	.53	.50	Youths' Champion Bals, Gray Sole	......65 .62
Youths' Champion Oxford, Black Sole	.....	.50	.47	Youths' Champion Oxford, Gray Sole	......55 .52

*No advance.

The Apsley Rubber Co., Hudson, Massachusetts, sends out its net price list in a 24-page pamphlet with a four-color cover. The half-tone engravings of the various lines are excellently drawn and well printed, some of them being shown in appropriate colors. Among the novelties is a line of pumps and Oxfords made from a new fabric in brown and gray stripes. Another noticeable addition is a wading shoe having a pure gum suction sole and a high lacing, with bellows tongue. An "Auto" gymnasium shoe with high foxing is another addition to this popular line.

The Canadian Consolidated Rubber Co., Limited, Montreal, Canada, devotes its September issue of "Foot Prints" to a catalog of sport shoes. This is a larger catalog than those previously mentioned and contains a very comprehensive list of the various lines made by this company. The illustrations are well drawn and engraved, and show some novelties, among them the new "Aviator" shoe shown and described elsewhere in this issue. Another novelty is a lawn bowling shoe similar in design to a line made in England which was illustrated in the September number of THE INDIA RUBBER WORLD. This catalog includes a number of lines of bathing shoes, bathroom and boudoir slippers, etc.

* * *

The Miner Rubber Co., Limited, Montreal, Canada, also uses its monthly house organ as an outing shoe catalog, which is quite elaborate in its arrangement, each page embellished with a well drawn illustration in colors, appropriate to the line of shoes mentioned on the same page, the "Greyhound" trade-mark being printed in outline at the top and the brand, "Miner's Greyhounds," at the bottom. The various lines are shown in color and particular attention is called to the pneumatic heel styles, and the lines made by the pressure cure process. Among the new ideas shown are the "Educator" line for children, the "Tramper" balmoral with high foxing and wing tip, and the "Beach" balmoral of white canvas with a tan rubber sole and heel but with white rubber foxing.

RUBBER EXHIBITS AT FIRE ENGINEERS' CONVENTION.

In connection with the forty-fourth annual convention of the International Association of Fire Engineers, at Providence, Rhode Island, August 29 to 31, a fine exhibition of fire apparatus and appliances was shown in the Armory building, among which might be mentioned the hose manufactured by the Bi-Lateral Fire Hose Co., Chicago, Illinois, and the Fabric Fire Hose Co., New York City. The Bowers Rubber Works, San Francisco, California, had an interesting exhibit of its pneumatic reversible landing mat, recently illustrated in THE INDIA RUBBER WORLD; the Dayton Rubber Manufacturing Co., Dayton, Ohio, exhibited its airless tires for use on fire apparatus; the Globe Manufacturing Co., Pittsfield, New Hampshire, made a good display of waterproof clothing; the New England Truck Co., Fitchburg, Massachusetts, had on exhibition a chemical and hose car equipped with large Goodyear pneumatic tires, and the Sewell

THE RUBBER CLUB OF AMERICA, INC.

The Seventeenth Annual Banquet of The Rubber Club of America, Inc., will be held in New York City on Monday evening, January 8, 1917, in the Grand Ballroom of the Waldorf-Astoria. The unqualified success of the last banquet and the general assurance that the coming event will bring out a much larger attendance have resulted in preparations being made to accommodate the expected numbers. An attractive program has been arranged and speakers of national reputation will entertain and edify the members and guests present.

The Executive Committee met at the Union League Club, New York City, September 21. Those present were: Van H. Cartmell, who presided; George B. Hodgman, William E. Bruyn, Paul W. Litchfield, Frederic C. Hood, Henry C. Pearson, Sidney S. Meyers, attorney, and Harry S. Vorhis, secretary.

A special committee consisting of Messrs. Pearson, Bruyn, Meyers and Vorhis was appointed to take up with the Treasury Department the classification of Pontianak now dutiable at 10 per cent ad valorem.

The Banquet Committee was recommended to appoint district committees for Boston, Trenton, Akron, San Francisco and Montreal, that interest in the annual banquet be furthered.

The following firm and associate members were elected:

FIRM MEMBERS.

Gordon Tire & Rubber Co., Canton, Ohio
Representative—H. B. McMaster.
The Falls Rubber Co., Cuyahoga Falls, New York
Representative—W. J. O'Donnell.
Turner Vaughn & Taylor Co., Cuyahoga Falls, Ohio
Representative—S. H. Vaughn.
The Alliance Tire & Rubber Co., Alliance, Ohio
Representative—Milton Bejach.
Connecticut Cottons Co., Boston, Massachusetts
Representative—Harry L. Burrage.
Featheredge Rubber Co., Inc., Chicago, Illinois
Representative—B. B. Felix.

ASSOCIATE MEMBERS.

P. T. Jackson, Bay State Cotton Corporation, Boston, Mass.
The following transfer of firm membership was made: The B. & R. Rubber Co., North Brookfield, Massachusetts, to Quabaug Rubber Co., North Brookfield, Massachusetts. Representative, T. G. Richards.

The following transfers from associate to firm memberships



SALESMEN, AGENCY REPRESENTATIVES, AND FACTORY EXECUTIVES OF THE FAULTLESS RUBBER CO. AT A RECENT CONVENTION.

Cushion Wheel Co., Detroit, Michigan, showed one of its cushion wheels for fire apparatus with part of the side steel bands and rubber flanges removed to show the position of the soft rubber cushion between the inner wheel and the tire felly, giving a very clear idea of its construction. There were many other exhibits of interest.

were made: W. G. Ryckman, New York City, to W. G. Ryckman, New York City. Representative, W. G. Ryckman; George Watkinson, New York City, to Standard Emarex Co., New York City. Representative, George Watkinson.

Discussions and routine business followed, closing one of the most satisfactory meetings held by this committee.

NEW INCORPORATIONS.

Albany Rubber Tire Co., Inc., September 14 (New York), \$3,000. Jennie F. Hurd, Edward M. Hurd, M. O. O'Donnell—all of Albany, N. Y.

Auto Ball Cock Co., August 11 (New Jersey), \$125,000. Robert B. Barber and Jane Massey, Barber, Hazleton, Pa.; William E. Massey and Mina R. Massey, 1001 Wesley avenue, Ocean City, N. J. Principal office, 421 Eighth street, Ocean City, N. J. To manufacture and deal in automatic plumbing supplies.

Chase National Import and Export Corporation, September 6 (New York), \$5,000. George H. Warrin, 478 Marion street; Albert E. Baker, 552 Forty-seventh street, and Leon Dalrymple, 162 Lefferts place—all in Brooklyn, N. Y. Principal office, 25 Beaver street, New York City. To deal in South American products, rubber, etc.

Chemical Pump & Valve Co., August 11 (New Jersey), \$30,000. Frank A. Warter and Emil Warter, Perth Amboy, and Fred Batzel, South Amboy—both in New Jersey. Principal office, 46 Commerce street, Perth Amboy, Middlesex County, N. J. To manufacture and deal in pumps, valves, and tanks.

Eagle-Picher Lead Co., September 2 (New Jersey), \$10,000-000. William Wood, Thomas J. McCoy, Alfred Burdsal, William C. Wood, and John Ritterhoff. Principal office in State of New Jersey is at Blanchard street, Newark. To manufacture and deal in lead and zinc products.

Elastic Braid & Lace Co., August 11 (Massachusetts), \$25,000. Charles M. Porter, 112 Boston avenue, Somerville; George Fick-eissen, 63 Reynolds avenue, Chelsea, and William E. Waterhouse, 46 Lake avenue, Melrose—all in Massachusetts. Principal office, Boston, Massachusetts. To manufacture and deal in elastic braid, laces, braided fabrics and similar products.

Fero's Lexington Store, Inc., September 22 (New York), \$10,000. James J. Fero, and William A. Miller, 792 Seventh avenue, and Alfred Hines, 1074 Lexington avenue—both in New York City. To deal in tires, auto supplies, etc.

Goodrich Auto Service Corporation, F. W., September 22 (New York), \$75,000. Frank W. Goodrich, 312 East Fifty-eighth street; Peter V. Hoyt, 745 St. Nicholas avenue, and Henry W. Showers, 15 Wall street—all in New York City. Tire and auto service station.

M. & L. Auto Co., Inc., The, August 10 (New Jersey), \$25,000. R. C. McIntosh (president and treasurer); Norman D. Laughlin (vice-president and secretary), and Silvia D. McIntosh (stockholder)—all of Plainfield, N. J. Principal office, 322 West Front street, Plainfield, N. J. To deal in automobiles, tires, oils and accessories.

Meyer Tire Duck Co., John H., September 11 (New Jersey), \$300,000. John T. Neff and Rollin G. Neff, 26 Beach street, East Orange, N. J., and Samuel C. Steinhardt, New Rochelle, N. Y. Principal office, 26 Beach street, East Orange, N. J. To manufacture and deal in cotton and other fabrics.

Mutual Tire & Rubber Co., August 22 (Delaware), \$1,000,000. E. E. Bishop, M. L. Gatchell, and I. M. Bristow—all of Wilmington, Delaware. Principal office, Corporation Registry Co., 900 Market street, Wilmington, Del. To manufacture and deal in tires for automobiles, motorcycles, bicycles, carriages, and vehicles of all kinds.

Newark Rubber Tire Co., Inc., September 6 (New Jersey), \$10,000. Harry J. Martin, 67 Cabinet street; William F. Rothlis-berger, 49 Osborne Terrace, and Joseph P. Dunn, 266 Halsey street—all in Newark, N. J. Principal office, Room 804, 810 Broad street, Newark, N. J. To deal in rubber tires, automobile supplies and accessories.

Northway & Christopher, Inc., September 14 (New York), \$5,000. George S. Northway, John H. Burke and Daniel J. Seubert—all of Syracuse, N. Y. Principal office, Syracuse, N. Y. To manufacture and deal in rubber goods, tires, etc.

Para Co., The, August 19 (New Jersey), \$10,000. Irving L. Wright, 918 Stuyvesant avenue; George W. Pearson, P. O. Box No. 444; S. Roy Heath, Fisher place, and Harold S. Maddock, 15 Atterbury avenue—all in Trenton, N. J. Principal office, 7 North Montgomery street, Trenton, N. J. To manufacture and deal in tires.

Peerless Tube Co., August 28 (New Jersey), \$50,000. Charles O. Geyer, W. F. Harding, and Lewis H. Condit, Jr.—all of 70 Locust avenue, Bloomfield, N. J. G. H. Neidlinger (president), C. R. Pitt (treasurer). Principal office, 70 Locust avenue, Bloomfield, N. J. To manufacture and deal in cement tubes, etc.

Phineas Jones & Co., May 15 (New Jersey), \$100,000. Henry P. Jones, Phineas Jones, and H. Percy Jones—all of 45 North Broad street, Newark, N. J. To manufacture and deal in tires, wheels, etc.

S. Schein & Sons, Inc., August 28 (New York), \$20,000. Joseph S. Schein, 816 East 176th street; Jacob M. Zinaman and Avel B. Silverman, 51 Chambers street—both in New York City. To deal in rubber, gutta percha, balata, etc.

Sioux City Tire & Manufacturing Co., August 30 (Iowa), \$220,000. C. F. Skirvin (president); John Nagle (treasurer), and Charles F. Sawyer (secretary)—all of Sioux City, Iowa. Principal office, 607-609 Trimble Block, Sioux City, Iowa. To manufacture rubber goods, automobile tires, etc.

Tire Company of California, Inc., September 20 (New York), \$7,500. Sydney Bernheim, 35 Nassau street, New York City; Catherine A. Weldon, 591 Seventh street, and Harry H. Jacobson, 555 Grand street—both in Brooklyn, N. Y. To manufacture auto tires, etc.

Triple Tread Tire Co., August 10 (Illinois), \$500,000. H. G. Lund (president), 4720 Dorchester avenue; M. Lund (secretary), 7219 South Park avenue, and Edward Grunich—all of Chicago, Illinois. Principal office, 1545 Michigan avenue, Chicago, Illinois. To manufacture and deal in tires, inner tubes, etc.

Vulcanized Rubber Co., June 20 (Maine), \$1,500,000. Alfred F. Jones (president); T. L. Croteau (treasurer), and James E. Manter (clerk)—all of Portland, Maine. To manufacture and deal in crude rubber, lumber, merchandise, etc.

Washington Rubber Products Manufacturing Co., Inc., August 29 (New York), \$5,000. Henry Siegel, Abraham S. Gussew and Alexander Meyer—all of 5 Beekman street, New York City. To manufacture rubber goods, especially bathing caps, folding bags, auto tops, etc.

BERLIN RUBBER CO. CHANGES ITS NAME

By order of the council, the name of Berlin, Ontario, Canada, was changed to Kitchener, September 1. The Berlin Rubber Manufacturing Co., Limited, its leading industry, in accordance with the above change, has renamed the corporation, and is to be known hereafter as the Kitchener Rubber Manufacturing Co., Limited.

MAPLE LEAF TO BUILD

Maple Leaf Tires, Limited, Toronto, Canada, has begun the erection of a new plant at Belleville, Ontario. The property was originally part of the Yeoman's estate and contains approximately 23 acres. The main building will be 281 feet long and the width throughout 62 feet, with two large extensions or wings to the northward making the total width 125 feet. Several subordinate buildings will also be constructed as speedily as possible. The factory will be equipped with the best modern machinery obtainable, every comfort for the workmen being considered. The approximate cost will be \$100,000 and employment will be given at the start to about 100 hands. The company expects to manufacture 250 tires daily and many other rubber products, such as belting, garden and water hose, shoe soles and heels, rubber bottles, etc.

News of the American Rubber Trade.

BRIGHTON MILLS BUILDS NEW PLANT.

IN connection with plans for increasing its product, the Brighton Mills, Passaic, New Jersey, large manufacturer of tire fabrics for the rubber trade, has purchased about 300 acres of land at Allwood, New Jersey, which is within a mile of the present plant. Nearly 50 acres of this property, which is located on the Newark branch of the Erie Railroad, about midway between Newark and Paterson, will be reserved for factory purposes, and the balance will be developed into homes for the employees. Building operations have just started.

It is planned to increase the total output by approximately 30 per cent. The machinery to be installed was ordered months ago, and it is confidently expected that the new plant will begin turning out tire fabric in January.

John Nolan has been engaged to plan out the streets and landscape effects. Morris Knowles, of Pittsburgh, Pennsylvania, will supervise the sanitary installations. The John W. Ferguson Co., Paterson, New Jersey, will be the builders, and Murphy & Dana, of New York City, have been engaged as architects for the houses.

RUBBER COMPANY SHARE QUOTATIONS.

The following market quotations of shares of rubber manufacturing companies on September 25, are furnished by John Burnham & Co., 115 Broadway, New York City, and 41 South La Salle street, Chicago, Illinois:

	Bid.	Asked.
Ajax Rubber Co. (new)	64 1/2	65 1/2
Firestone Tire & Rubber Co., common	105 1/2	106 1/2
Firestone Tire & Rubber Co., preferred	110	112
The B. F. Goodrich Co., common	72 1/2	73 1/2
The B. F. Goodrich Co., preferred	112	114
Goodyear Tire & Rubber Co., common	270	290
Goodyear Tire & Rubber Co., preferred	106 1/2	108 1/2
Kelly-Springfield Tire Co., common	83	83 1/2
Kelly-Springfield Tire Co., 1st preferred	98	100
Miller Rubber Co., common	250	275
Miller Rubber Co., preferred	104	106
Portage Rubber Co., common	160	170
Portage Rubber Co., preferred	160	170
Swinehart Tire & Rubber Co.	90	96
United States Rubber Co., common	59	59 1/4
United States Rubber Co., preferred	113	114

RUBBER COMPANY DIVIDENDS.

The Rubber Goods Manufacturing Co. paid its 70th regular quarterly dividend of 1 1/4 per cent on the preferred stock on September 15 to stockholders of record September 12.

A 2 1/2 per cent dividend on common stock and a 1 1/4 per cent dividend on preferred stock has been declared by the Portage Rubber Co., the common stock dividend payable November 15 to stockholders of record November 3, and the dividend on preferred payable October 1 to stockholders of record September 20.

A quarterly dividend of 1 1/2 per cent on the preferred stock of the Kelly-Springfield Tire Co. has been declared, payable October 2 to stockholders of record September 15.

PROPOSED FISK INCREASE.

Stockholders of the Fisk Rubber Co., Chicopee Falls, Massachusetts, have been called to meet on October 2 to vote on increasing the capital stock by \$12,500,000. Of the new stock, \$7,500,000 would be first preferred convertible, and \$5,000,000 second preferred. At the same time the stock-

holders will vote on increasing the common stock by an amount sufficient to take care of the conversion of the present outstanding second preferred stock, and the proposed new preferred issues. The adjustment of Fisk stocks is to be completed by reducing the amount of the authorized capital stock by \$5,000,000, the amount of second preferred stock, Series B, authorized a few months ago but not issued.

STANDARD TIRE COMPANY FORGES AHEAD



C. P. SMITH.

Charles P. Smith, newly appointed sales manager of the Standard Tire & Rubber Manufacturing Co., Cleveland, Ohio, reports an increase in the company's business in the last six months of 650 per cent. The plant is running day and night, with three shifts, and enlargements are being made, and machinery and equipment ordered, which will give a capacity of about 600 tires daily. The Standard company has recently put on the market a new tire called the "Velvetread."

"RUB-HIDE" IN RUBBER.

A marked tendency in the compounding of india rubber today is a lessened use of inorganic and an increased use of organic fillers. While we hold no brief for the Henderson Rubber Co., Baltimore, Maryland, the notable increase in its business, as shown by the addition to the plant, would seem to prove that "Rub-Hide" was finding a place in the rubber trade. This substance, made from raw hide according to rubber manufacturers, possesses the following virtues: It adds notably to the tensile strength while giving practically the same elongation; it has no deteriorating effect, but rather is a preservative. That it stands the heat as in vulcanization is shown by the fact that it is used not only in soft rubber goods such as tires, inner tubes, and mechanicals, but in hard rubber as well. From 25 to 33 per cent is used in ordinary compounding.

WATER-CURED RUBBER GOODS.

The S. & W. Rubber Manufacturing Co., College Point, New York, is about to put on the market a new line of inner tubes, called "Velvet Water Cured" tubes. These goods will be, as the trade-mark indicates, cured in hot water; they will be produced in two colors, gray and non-blooming bright red.

Water-curing is not new, as quantities of hard rubber goods are thus cured. As far as soft rubber goes, the process is rarely used and certain mechanical difficulties being overcome, offers advantages—for example, water-cured goods are not likely to be overcured or "burned."

The company is also about to put on the market, tire casings, dress shields, elastic bands, bathing caps, jar rings, packing, etc., all water-cured.

The process is a product of the veteran inventor and experimenter in rubber goods, Arthur C. Squires.

PERSONAL MENTION.

Charles S. Willis, president of the United States Rubber Co., New York City, has returned from an extended motor trip which included visits to the Canadian plants affiliated with the company.

The Pan American Society of the United States held a largely attended informal luncheon on September 11 in honor of His Excellency, Dr. Lauro Severiano Müller, Minister of Foreign Relations of Brazil, who sailed the next day for South America.

Frank Poel, formerly of the crude rubber importing firm of Poel & Arnold, returned from Europe the middle of last month.

Jose S. de A. Silva, of Rio de Janeiro, Brazil, inventor of the De Silva compounding machine, is now visiting in New York City.

Samuel Jacobless, vice president of the General Rubber Co., New York City, who is now in Sumatra, is expected to return next month.

Raymond S. Willis, president of the United States Rubber Co., who is at present in Europe, is expected to arrive home in November.

George Wilson has been appointed transportation manager of the Dominion Rubber System, with headquarters at the Canadian Consolidated Rubber Co., Limited, Montreal, Canada.

David S. Shearman, president of the Oldtown Rubber Co., Xenia, Ohio, is an heir of the estate of Mrs. Hetty Green, being a direct descendant of Sylvia Ann Howland, Mrs. Green's aunt, who left a trust fund of about \$2,500,000. Mr. Shearman and his five brothers will receive the share from the Howland estate, which would have been the portion of their father, who died in 1895.

Charles H. Roth, formerly vice-president and sales manager of the American Tire & Rubber Co., has been engaged as sales manager of the newly organized Iowa Rubber Tire Co., Bettendorf, Iowa.

Arthur Jackson Wills, whose portrait and biographical sketch appeared in the September 1 INDIA RUBBER WORLD, writes that a misstatement appeared therein, as he is not a graduate of Stevens Institute of Technology, although he attended that institution.

Harry L. Miller has been made manager of the Fisk Co. of Texas, at San Antonio, Texas, and was also elected secretary and a director of the company.

W. M. Doucette succeeds E. P. White as manager of the New York City branch of the Portage Rubber Co., at 1924 Broadway.

Clarence R. Bollinger has been appointed an adjuster of the Goodyear Tire & Rubber Co., Akron, Ohio, and will take charge of that department in the Goodyear branch at Buenos Aires, Argentina.

G. B. Overcynnder, Rotterdam, Holland, managing director Surinam Balata Co., passed through New York last week on his way to Paramaribo, British Guiana.

G. A. PIRELLI IN NEW YORK

G. A. Pirelli, of the well-known firm of Pirelli & Co., Milan, Italy, was in New York last month on business for his company. He reports unprecedented activity in the various plants controlled by the Pirelli interests, due to the large government and domestic orders. Building extensions and new plants are being erected to meet the requirements of the increasing business.

Replete with information for rubber manufacturers.—Mr. Pearson's "Crude Rubber and Compounding Ingredients."

NEW "USRUBCO" PURCHASING AGENT.

RAYMOND S. WILLIS, who has just been appointed purchasing agent of the United States Rubber Co., New York City, brings to this position a broad and varied business experience. He was a member of the class of 1898 in the Massachusetts



RAYMOND S. WILLIS

Institute of Technology. On leaving this institution at the end of his junior year, he went ranching in Texas, Arizona and New Mexico. In 1900 he went to Mexico, where he became interested in rubber. From 1908 to 1910 he was connected in an executive capacity with the National Paper & Type Co.'s office in Mexico City. In 1911 Mr. Willis became secretary and purchasing agent in Barcelona, Spain, for the Barcelona Traction, Light & Power

Co. This work was under the direction of the Pearson Engineering Corporation, Limited, New York City, which had previously built street railways in Mexico City and Rio Janeiro, and had charge of the engineering work of the Mexico Northwestern Railroad. Naturally, in connection with a project of this size, Mr. Willis had many invaluable experiences, and his work as purchasing agent in Spain opened his eyes to the possibilities afforded by the war for the extension of American markets. Consequently Mr. Willis resigned from the Barcelona Traction, Light & Power Co. to open his own export office in New York City.

Mr. Willis has been remarkably successful here and still retains an interest in the export business, although his entire time in the future will be devoted to his duties as purchasing agent for the United States Rubber Co.

SON OF A RUBBER ENGINEER

Joseph A. Dennison, who, with his wife was lost in the mountain wilderness of New Hampshire, and rescued in an exhausted condition by a search party, was the son of John Dennison, for many years engineer at the works of the Tyer Rubber Co., Andover, Massachusetts. Several of the old engineer's children, too, found employment in the factory, while they were building up the family fortunes and getting the wherewithal to pay for their education. Joseph A. Dennison is a prominent and successful lawyer, a self-made man. After attending the public schools and Phillips Academy in Andover, he went to Dartmouth College, but left to take up newspaper work in Boston, Massachusetts, meanwhile studying law, and later graduating from Boston University Law School. He was Assistant District Attorney in Boston in 1905-1906, resigning in the latter year and resuming his law practice. Both Mr. and Mrs. Dennison are recuperating from the exhaustion caused by exposure and hunger during their wanderings in the trackless forest. A somewhat pathetic incident connected with this misadventure was the detention in Concord, New Hampshire, several days afterward of two Massachusetts boys who ran away from home to search for the Dennisons, hoping to secure the reward offered. They had not heard of the rescue of the missing couple.

TRADE NOTES.

Concerning the item of news of the Wilson Rubber Co., Canton, Ohio, which appeared in the September issue of *THE INDIA RUBBER WORLD*, it should be noted that the Wilson company has leased the plant formerly occupied by the Canton Manufacturing Co., and not that of the Canton Rubber Co., as was stated in the above mentioned paragraph. The Canton Rubber Co. is still located in the same factory building in Canton as heretofore, and is in no way connected with the Wilson Rubber Co.

The Republic Rubber Co., Youngstown, Ohio, is planning for additions which will include one new building and the remodeling of one of the existing buildings. Mills, calenders, boilers and various machinery will also be added, which will more than double the company's capacity in its pneumatic tire department, as well as considerably increase its capacity in other departments.

William H. Stiles, crude rubber importer and broker, has removed his office to 79-85 Wall street, New York City.

A. G. Spalding & Bros., manufacturers of sporting goods, have removed to the six-story building at 523 Fifth avenue, New York City, which has been completely remodeled to fill the requirements of their business.

The Falls Rubber Co., Cuyahoga Falls, Ohio, has removed its Cleveland, Ohio, branch from 2001 to 1844 Euclid avenue.

Among the wide range of exhibits at the Canadian National Exhibition at Toronto was that of the Dunlop Tire & Rubber Goods Co., Limited, showing an extensive line of mechanical goods and an interesting presentation of its popular rubber heels. Gutta Percha & Rubber, Limited, also made a creditable showing of military rubbers, lumbermen's rubber boots, leather tops, plain overs, croquets, tennis and sporting shoes and other offerings in the rubber footwear line.

The New York City office of the Boomer & Boschert Press Co. is now located at 25 West Broadway, Room 27.

H. B. Niblette, manager of the New York City branch of the Rubber Products Co., Barberton, Ohio, announces that this office is now settled at its new location, 148 West Sixty-eighth street, just west of Broadway.

The Electric Hose & Rubber Co., Wilmington, Delaware, will shortly erect a new one-story machine shop, 40 by 100 feet, to cost about \$11,000.

The Lycoming Rubber Co., Lycoming, Pennsylvania, employs more than 500 persons, and now has a daily capacity of 5,000 pairs of rubber shoes.

The new steel and concrete building of the National Rubber Co., Pottstown, Pennsylvania, is practically completed. The company recently declared its first quarterly dividend of 2 per cent.

A certificate of increase in the capital stock of the Stungo Radium Rubber Co., Pittsburgh, Pennsylvania, has been filed with the State Department at Dover, Delaware, increasing the capital from \$1,000,000 to \$3,000,000.

W. H. Jones, Southern selling agent for the United States Rubber Co., with headquarters at Baltimore, Maryland, was recently elected temporary chairman of the branch organization of The Rubber Club of America, Inc., lately effected at a meeting held at the Hotel Belvedere, Baltimore.

The net earnings of the United States Rubber Co., New York City, for six months, from January 1 to June 30, 1916, after deducting all interest charges, were \$4,920,649.80.

It is stated that an eastern syndicate has arranged to take over a large ranch in the vicinity of Redlands, California, for the planting of guayule and the erection of a factory for extraction of the rubber from the plant. The proposed enterprise will require an outlay of about \$1,000,000 and the employment

of at least a thousand men. It is said that about 70 beds or 2,000,000 plants have already been set out.

On account of the high prices of materials, the shoe repairers in various parts of Canada have formed local associations in the larger cities of Canada for the purpose of establishing uniform rates for repair work. It is noted that in St. Catherines, soling men's rubber boots is priced at \$1.85, while in Welland \$1.50 is charged for similar repair. Attaching rubber heels on men's boots is established at 50 cents (including cost of the heels) in all of the various cities, but for women's rubber heels, attached, the charges vary from 40 to 50 cents in the different localities.

The board of directors of the Kelly-Springfield Tire Co., New York City, has decided to retire from the retail field in that city, and is notifying its patrons of the names of dealers and distributors of its tires to whom retail orders should be given. The company states that if a customer desires to have his requirements filled direct, the orders will be executed, but the invoice covering the goods delivered will be mailed from one of the jobbing houses.

ROYAL CORD TIRES HOLD BOTH TRANS-CONTINENTAL RECORDS.

Last month a new record of 5 days 3 hours and 31 minutes from San Francisco to New York was made by a car equipped with Royal Cord tires manufactured by the United States Tire Co. This breaks the world's record by 14 hours and 59 minutes. The men who drove the car in relays reported that they experienced no tire trouble whatever.

Not satisfied with this remarkable record, a return trip was immediately arranged for and made in 5 days 17 hours and 23 minutes, breaking all previous records from New York to San Francisco.



THE GRYPHON RUBBER & TIRE CORPORATION.

The Gryphon Rubber & Tire Corporation is now located in its commodious new factory overlooking the Harlem River at Kingsbridge, New York, on the line of the New York Central Railroad. This location is admirable with respect to cheap elec-



tric power, suitable housing for labor, shipping facilities, and convenience to the market for raw material as well as for the sale and distribution of products. The corporation has been manufacturing tires about

the first of November, and modern equipment is being installed which will allow for an output of 400 completed tires—shoes and inner tubes—per day. The president is Joseph W. Jones, a prominent engineer and manufacturer of wide experience, and the general manager, A. E. Gordon, has had over 15 years' experience in the manufacture of tires and other rubber goods.

GOODRICH BRANCH CHANGES.

W. W. Loder has been made local manager of the branch of The B. F. Goodrich Co. at San Diego, California.

William J. Schwan is now manager of the service station at Yosemite, California. This station is to be classed as a tire depot.

H. W. L. Kidder has been appointed local manager at the Columbus, Ohio, depot of the Goodrich company.

A. H. Willett has succeeded R. Hasler as manager at New Orleans, Louisiana.

The Phoenix, Arizona, branch is now located at the corner of First and Monroe streets.

PERFECTION TIRE & RUBBER CO.

It is reported that the Perfection Tire & Rubber Co., with offices in the Marquette Building, Chicago, and factories at Fort Madison, Iowa, and Wabash, Indiana, has purchased a large tract of land in the Factoria district of Fort Madison for the erection of 100 houses for the use of the company's employees. Five thousand dollars has been deposited with a local bank as a guarantee of good faith.

On September 1 a change in officers of this company went into effect, and they are now as follows: C. R. Cole, president; R. J. Evans, vice-president; E. A. Stickelman, treasurer, and C. W. Harris, secretary.

Charles C. Gehring, formerly manager of the Pittsburgh branch of the United States Tire Co., has been transferred to the Cleveland, Ohio, branch, where he will act in the same capacity.

PENNSYLVANIA RUBBER CO. CONVENTION.

At the recent convention of the Pennsylvania Rubber Co., Jeannette, Pennsylvania, managers of 14 branches, including such distant points as San Francisco, California, and Seattle, Washington, gathered together at the home plant. Important problems of the coming season were taken up and discussed with the greatest interest, and announcements were made concerning the New Bar Circle automobile tire, shown herewith, and a new bicycle tire similar in style of tread, and also called the Bar Circle.

Two of the meetings were held at the Greensburg Country Club, where luncheon was provided, and opportunity afforded the visiting managers to play golf. The social features of the conference were exceptionally pleasant, including a reception at the home of Seneca C. Lewis, general manager of the Pennsylvania company, a chicken and waffle dinner at Si Poole's Farm, and a lamb roast and picnic at Immel's Reservoir.

The new slogan adopted by the company is "Eight Million Dollar Sales in 1917." The August sales of



the company were the most satisfactory in its history, reaching over the half million dollar mark.

BOONE TIRE & RUBBER CO. TO BUILD.

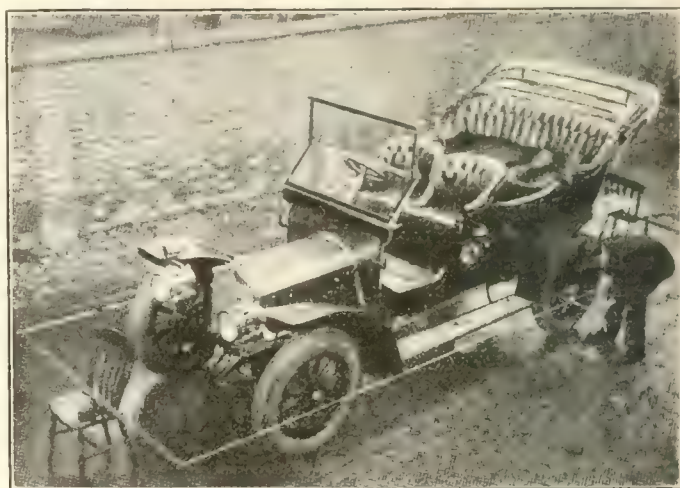
The Boone Tire & Rubber Co. will shortly erect a plant at Belvidere, Illinois, containing 25,000 square feet of floor space. The buildings will be U-shaped in plan. The dimensions of the main building will be 50 by 180 feet, with two wings, 60 by 120 feet. The initial plant will have a capacity of 150 casings per day, and

a full line line of mills, calenders, and mold and heater equipment will be installed to handle this number of tires. I. V. Maclean, formerly president and general manager of the Hawkeye Tire Co., is president of the Boone company.

A SIMPLE METHOD OF ALIGNING MOTOR CAR WHEELS.*

UNDULY rapid wear of tires is in almost every case due to disalignment of the wheels. This results in greatly reducing the normal mileage, even though wheels are only slightly out of parallel. To detect this defect and properly correct it requires something more reliable than the eye, but nothing very elaborate is called for.

The illustration shows a very simple and practical method. Two strips of wood about 7 feet long are placed together and a small hole is then bored in the ends of both strips at the same time. Two pieces of twine must be cut in exactly equal



lengths (about 15 feet each) and the ends passed through the holes in the strips and knotted, care being taken that the two lengths of twine are still equal. Two ordinary kitchen chairs are then placed, one in front and the other at the rear of the car, with their backs toward the vehicle. Each chair serves to support one of the wood strips and the two lines of twine are stretched on either side of the car parallel to each other. The lines being roughly in position, adjust one of the wood strips by sliding it on the chair until one of the rear wheels and its corresponding line is found to be exactly parallel, fore-and-aft, by measuring the distance between the twine line and the rim. Then bring the front wheel on the same side of the car into alignment with the twine, without disturbing the first rear wheel, which is easily done if the front wheels are jacked up.

If the four measurements are the same, the wheels "track" perfectly. However, a slight variation between the front and rear wheels is permissible, but the measurements fore-and-aft of each wheel must be equal. Similar measurements are then taken of the second rear wheel on the opposite side of the car and the remaining front wheel is measured in the same way as previously described.

CORRECTION.

Owing to a clerical error in rearrangement of the list of the Rubber Trade Preparedness Committee, in the September 1 issue, the name of the Continental Rubber Co. of New York was omitted, President G. H. Carnahan's name being credited to another corporation with a somewhat similar title.

*From an article by the Palmer Tire Co., Limited, London, England.

TRADE NOTES.

The Pennsylvania Rubber Co., Jeannette, Pennsylvania, has sent to the trade an announcement, effective October 1, of a reduction in the prices of its Vacuum Cup, Ebony Tread and Bar Circle tires, claiming that, notwithstanding the present high average level in the raw material market, the growing demand for its tires has enabled the company to effect substantial savings in cost, in which it permits its customers to share.

The United States Rubber Co., New York City, received the only prize offered for tires at the Exposition Nacional de Panama, held in the city of Panama in the spring to commemorate the discovery of the Pacific ocean by Balboa. This award was in the form of a diploma and gold medal, which have been recently received by the company.

Under the direction of H. H. Replogle, manager of sales, the sales organization of the Marathon Tire & Rubber Co., Cuyahoga Falls, Ohio, held a convention at the home plant during the week of September 11. The conference was devoted to important matters of sales business, particularly items pertaining to taking care of the increased business of the company, which has practically doubled during the last 12 months. The management was much impressed with the enthusiasm and loyalty of the sales staff, and it is planned to hold similar conferences annually.

The Hawkeye Tire & Rubber Co., Des Moines, Iowa, is now operating in all departments. Charles A. Besaw, president of the Quality Rubber Co., Hartsville, Ohio, is the consulting chemist.

The Tire Reconstruction & Supply Co., Inc., New York City, has increased its capital stock from \$25,000 to \$75,000. This company is the exclusive Eastern distributor of the "Reliable" tire. A service station is maintained at 685 Eleventh avenue for repairing of all kinds of tires and tubes, especially for the trade, and the reconstruction of old tires, which are guaranteed for 3,000 miles at approximately one-half the cost of a new tire.

The Lion Tire & Rubber Corporation, which some months ago acquired the H. J. Heinz Co. factory at Lafayette, Indiana, will shortly commence operation.

H. J. Succop has been placed in charge of the Oklahoma branch of the Atlas Tire Co., New York City, tire jobbers and retailers. Mr. Succop has been in the tire business for seven years, starting with The B. F. Goodrich Co., and prior to his connection with the Atlas company was manager of the Knight Tire Co. at Pittsburgh, Pennsylvania. He reports that the Atlas company has almost doubled its business this year, and is about to open five more branches.

The Walters Rubber Co. of New York, Inc., distributor of the product of The Federal Rubber Co., Cudahy, Wisconsin, and "Walters" red tube, contemplates opening a tire storehouse at Mineola, Long Island, from which prompt delivery may be made. H. S. Walters, secretary and treasurer of the company, was previously connected with the United States Rubber Co., and the Federal company.

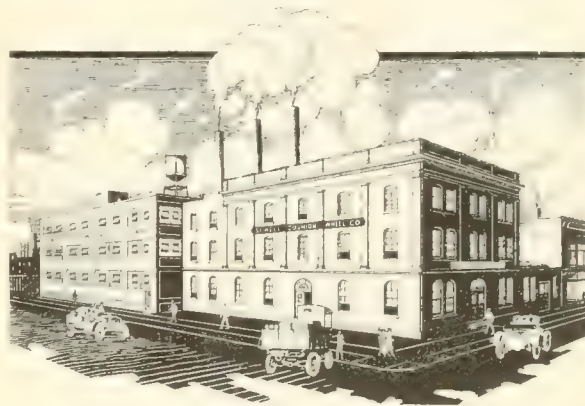
John McTaggart, an automobile engineer of Philadelphia, Pennsylvania, has invented an inner tube said to be practically impervious to puncture. The inventor decreased the air chamber 22 per cent and introduced a flexible steel mesh into its construction, producing a tube which has withstood remarkable tests.

Indiana has a new rubber enterprise in prospect in the Alpha Rubber Manufacturing Corporation, notice of whose incorporation appeared in the August issue of THE INDIA RUBBER WORLD. Fifty thousand dollars of the authorized capital of \$1,000,000 has been disposed of, and \$75,000 is about to be issued to pay for a plant in Indiana. The new company expects to manufacture tires as well as reclaim rubber.

It is expected that the new factory of the Brunswick-Balke-Collender Co. at Muskegon, Michigan, will be completed within two months' time. The plant occupies 40,000 square feet of floor space and will cost between \$40,000 and \$50,000. In order to provide for the increase in the number of its employes, the company has also contracted for the erection of at least 24 double dwellings, to be occupied only by its own workers.

SEWELL CUSHION WHEEL CO. EXPANDS.

The Sewell Cushion Wheel Co., Detroit, Michigan, is enlarging all facilities to allow for an increased output of its product—a wood and steel wheel with a soft rubber cushion between the inner wheel and outer felly. Ample precautions are being taken to guard against shortage of material, the new addition increas-



ing the floor space fourfold and enabling the company to carry a large reserve stock of rubber cushions, wood and steel, and at the same time to greatly increase production, the sales so far this year showing more than 100 per cent increase over the same period last year.

The new building is of reinforced concrete and steel construction, 71 by 74 feet in dimensions, three stories and basement, and is located at the rear of the company's property at the corner of Gratiot and Beaufait avenues. The executive offices, private offices of officials, and a large general office and reception room will occupy the second floor, the remaining space on this floor to be used for manufacturing the wooden part of the wheels. The entire first floor will be used for a machine shop, assembling departments and a fireproof vault for valuable papers, etc., a large vault for storing rubber having been provided in the basement. Careful attention has been paid to all details affecting the health and comfort of employes, and every modern convenience, including several sanitary drinking fountains on each floor, will be supplied.

THE ALLIANCE RUBBER CO. REINCORPORATES.

The reorganization of the Alliance Rubber Co., decided upon at a stockholders' meeting on August 24, will include reincorporation under the name of the Alliance Tire & Rubber Co. Stockholders will receive preferred stock at par and a 20 per cent stock dividend payable in common stock of the new company, also having first call on the securities offered to the general public. The factory management will remain the same as it has been since the business was begun.

The Alliance company has been unable to take care of all the business that came its way during the past year and the extra capital will be used for the enlargement of the factory, including a three-story structure closely resembling the original plant; the installation of additional mills, calenders, vulcanizers, molds, cores, etc., and the purchase of crude rubber and fabrics in larger quantity than has heretofore been possible.

The Obituary Record.

PIONEER IN THE GUAYULE INDUSTRY

FRANCISCO MADERO, father of the late President Madero of Mexico, and one of the first to develop the guayule industry, died at his residence in New York city, September 3,

aged 67 years. He was born on March 11, 1849, at Rio Grande, in the State of Coahuila, and was educated in Belgium, graduating from college there with high honors. His grandfather, Francisco Madero, owned nearly a million acres of land in Texas, but at the time of the war between Mexico and the United States, the family fled to Mexico, where, with his son, Evaristo, he settled at Rio Grande. Later the family moved to Parras, Coahuila, where Evaristo and

Francisco, his eldest son, assisted materially in building up a new fortune. They bought a large acreage of land at Parras, established cotton mills and planted extensive vineyards, manufacturing cloth, raising wheat and making wine. Later, Francisco acquired a cotton plantation to supply cotton for the mills.

When it was discovered that guayule was a rubber producer, Francisco, his brother, Gustavo, and an American college friend, were among the first to appreciate the value of the discovery, and they at once instituted a factory at Parras for the extraction of the gum. They afterwards built factories at several points in Mexico, the family acquiring more than 2,000,000 acres, or more than 4,000 square miles, where the guayule plant grew wild. Francisco owned, personally, the works at Cuatro Cienegas in Coahuila, the principal factories belonging jointly to himself and other members of the family being the "Compania Explotadora Coahuilense, S. A." at Parras, and the "Compania Ganadera de la Merced, S. A." at Cuatros Cienegas. These plants were fully equipped for the extraction of the gum. In 1908 the eight factories were producing 350 tons a month, and an immense business was being done up to the time of the recent internecine war in Mexico, during which his son, Francisco I. Madero, then president of the Republic, and another son, Gustavo, were assassinated in February, 1913. The family fled to this country, and have resided in New York City ever since. The entire Madero property was confiscated about a year ago, but a month ago was returned to the family by the present *de facto* government.

The deceased was a typical representative of the high-class Mexican family—a wide-awake, enterprising business man, and a polished gentleman. He attained to the thirty-third degree in Masonry. He was fond of searching out deserving, talented young men, and paying for their education. Since his death

came to light through letters of condolence. He was highly honored in his own country and had many friends there, as well as a wide circle in New York City.

Francisco Madero married Miss Mercedes Gonzales Treviño, of Monterey, Mexico, who survives him. They had seven sons and four daughters, all of whom are now living except the two above mentioned.

AN EFFICIENT YOUNG OFFICIAL

PAUL SCHMIDT, secretary of the Rubber & Guayule Agency, Inc., New York City, died at the Englewood Hospital, Englewood, New Jersey, on his 29th birthday, after many months of suffering. Mr. Schmidt was born in Hamburg, Germany, September 13, 1887, and received his education in the public schools of that city.



PAUL SCHMIDT.

On graduating he entered the office of Weber & Schaer in Hamburg and for ten years occupied steadily advancing positions in the rubber department of that concern. Three years ago he came to New York City and entered the employ of the Rubber & Guayule Agency, Inc., of which he became secretary and a director.

Early in the present year Mr. Schmidt made a trip to Mexico in behalf of the company, remaining there about two months, during which

time he evidently contracted a serious malady which was undoubtedly the ultimate cause of his death. After his return to New York he was operated on for appendicitis, and on account of his weak condition he suffered a relapse, causing his death in the day mentioned.

Mr. Schmidt was engaged to be married to an estimable young lady in Hamburg but, because of the war and also on account of his sickness, the wedding had been postponed until November of this year. He was a young man of unusual ability and promise and his early demise is the cause of profound regret, not only to his business associates but also to a wide circle of friends and acquaintances which he made during his residence in this country.

ROBERT J. BOWES.

Robert J. Bowes, for 27 years connected with the Lawrence Felting Co., of Millville, Massachusetts, and one of the best known mill men in Southern New England, died at his home in Millville, on September 11, from heart and kidney complications brought on by chronic rheumatism. He was born in Lawrence, Massachusetts, July 16, 1871, and moved to Millville with his parents in 1877, and had lived there ever since. He was educated in the public schools in Millville and Blackstone, Massa-

chusetts, and graduated from the Woonsocket high school, at Woonsocket, Rhode Island.

Following his graduation he entered the Lawrence Feltng Co. with his father, the late William J. Bowes, who was the founder of the plant and for years its manager. Upon the death of his father, Mr. Bowes assumed management of the business and continued in charge for some time after the United States Rubber Co. acquired it, remaining until July 1, 1915, when, after 27 years' service, he resigned on account of poor health.

During the past summer Mr. Bowes spent much of his time at his summer home at Pleasant View, near Narragansett Pier. About the first of September he experienced a change for the worse and later returned to Millville, where he had another sinking spell and gradually grew worse until death came. He was a member of Millville Lodge, United Workmen, and Woonsocket Lodge of Elks. He is survived by his wife and two daughters, his mother, three brothers and two sisters.

LIEUTENANT ROBINSON.

President W. H. Robinson, of the Canadian Consolidated Rubber Co., Limited, Montreal, Canada, has the sympathy of his hosts of friends in the trade in the recent loss of his son, F. Reginald Robinson, who was killed in action on August 19. When the 73rd Royal Highlanders of Canada was organized, he was among the first to join, and afterwards qualified as a lieutenant. His battalion went to England early this spring, and he had been only one week at the front when death overtook him.

A VETERAN BOOTMAKER.

Otis York, one of the oldest employees, as well as one longest in service, in the Boston Rubber Shoe Co.'s Fells factory at Malden, Massachusetts, dropped dead of heart disease at the

door of his home in that city on September 1, 1916, at 65 years old.

HIS SON WELL KNOWN IN THE TRADE

James L. Locke, father of Colonel Frank L. Locke, for many years superintendent of the Boston Rubber Shoe Co., died at the home of a nephew in Chichester, New Hampshire, aged 84 years. He is survived by two sons and two daughters.

S. SCHEIN & SONS, INC.

The New York and London headquarters of S. Schein & Sons, Inc., dealers in crude and scrap rubber, are in process of enlargement. The New York City branch was opened about a year ago at 140 Nassau street, and warehouse facilities being found necessary to care for the expansion of the company's American business, a six-story building was secured at 30 City Hall Place, where alterations and improvements are now being made. The European headquarters have been transferred from Finsbury street, London, to 66-70 Lawrence Road, Tottenham, England. This new plant has a frontage of 240 feet and a depth of 230 feet and consists of six buildings completely equipped for the expeditious handling and grading of rubber material in crude, scrap, finished or semi-finished state. Simon Schein and his son, Stanley, are in charge of the business at Tottenham, the New York plant being under the supervision of Joseph and Maurice Schein.

The manufacturers of toys in Canada formed an association last March to foster the production and marketing of Canadian made toys in the Dominion. The rubber toy industry is appropriately recognized by the choice of J. A. Wade, of the Canadian Consolidated Rubber Co., Montreal, as vice-president.



POOR PACKING OF PONTIANAK

Rubber manufacturers have often complained of the bad shape in which rubber arrives, particularly when it comes from a distance. The accompanying illustration shows a shipment of Pontianak just as it was unloaded at Bush Terminal Docks, Brooklyn, New York. The picture is so graphic that further comment is unnecessary.

THE RUBBER TRADE IN AKRON.

By Our Regular Correspondent.

A STATISTICAL report for the state industrial commission reveals the fact that during 1915 the rubber companies in Summit County, Ohio, practically all of which are in Akron, paid \$21,733,088 in wages and salaries. This is 61.1 per cent of the total payroll of the county, and is far in the lead, the second largest being that of the foundries and machine shops, with only \$2,495,120.

Although hundreds of new homes have been built in Akron during the past summer, the housing problem is still unsolved. Many changes at the factories are due to the fact that men come here to work, expecting to bring on their families, and when, after six months' time they are unable to find a house for rent, return where they came from because they cannot afford to maintain their families in other cities. Officials of The B. F. Goodrich Co. and other concerns employing thousands of men are now working on plans to meet this growing need. A plan similar to the farm credits system, where the men would eventually become home owners, has been proposed. This, it is urged, would not only insure permanent growth, but would induce workmen to save.

The Goodyear Tire & Rubber Co. has solved the housing problem for its employes by building houses on the easy payment plan. An addition of 350 acres has just been made to Goodyear Heights, a tract of land laid out for workmen in the plant of the company. On this land employes can build their own homes on the basis of rent, without any large first payment.

Activities of Akron's building and loan associations will be made clear to citizens who do not fully appreciate their work when the Ohio Building and Loan Association meets in Akron October 11-12, in its annual convention. All visitors to the city will be given rubber badges made in elaborate designs. When this association was organized there was no state control of the funds of building and loan associations, and through its efforts a bill was passed submitting all such institutions to state examination so the interests of their patrons would be safeguarded.

It is reported that the Kelly-Springfield Tire Co. has decided to change its location to Cumberland, Maryland. It is understood that the authorities of that city have offered very large cash and land inducements, involving \$750,000 and 75 acres of eligibly located land for a factory site.

It was proposed at the meeting of the Firestone Tire & Rubber Co., held September 30, that the capital stock shall be increased from \$4,000,000 to \$50,000,000, of which \$40,000,000 is to be common and the balance preferred. Present holders of \$1,000,000 preferred stock have been notified that the entire issue will be redeemed at 110, November 1. It is also the present intention to declare a 700 or 800 per cent dividend on the common stock. The full report of this meeting will be published in the next issue.

The track team of The B. F. Goodrich Co. won the one-mile relay race and the Police Trophy cup at the Police Field Meet held at Cleveland, Ohio, last month. The Akron team walked away with all the honors from Cleveland's best factory athletes. They won first and second in the mile, second in the 220-yard dash, second in the quarter, third in the high jump, and first and second in the half-mile, or a total of 36 points, 19 points more than the Hydraulic Pressed Steel Co. team, which was second in the meet.

Present building operations of the Goodyear Tire & Rubber Co. include more room for the office force as well as the factory

workers and will provide a much larger capacity both for tires and mechanical goods, one new building now nearing completion being devoted exclusively to the manufacture of mechanical goods. To provide for the constant flow of electric power and at the same time conserve the water supply which rotates the 10,000 K. V. A. turbine at the plant of the Goodyear company, a battery of five cooling towers is being erected.

At the Goodyear field and track meet held on Labor Day at Seiberling Park, more than 1,000 persons competed for supremacy in the various sports. The field was resplendent with the Goodyear colors, orange and black, and large American flags, and the carnival opened with a baseball game between the Akron and Boston Goodyear teams, won by the home team. While this was in progress, boxing and wrestling events were conducted in two separate rings. Races of every kind and description followed, as well as fancy diving, quoits, tennis, bait casting, nail driving, trap shooting, cock fights, clock golf and greased pig chases.

Woodson Reese, for the past two years manager of the Goodyear branch at Philadelphia, Pennsylvania, has been transferred to Akron as special factory representative.

* * *

The Denmead Rubber Co. will locate on the Denmead property in East Akron. Nearly three acres of land compose this property, which has the finest water privileges in the state, the Little Cuyahoga River passing through a part of it.

The Denmead company will take over from the Denmead Tire & Supply Co. the manufacture of rubber heels and soles and also the good will of the latter company.

* * *

The capital stock of the Star Rubber Co. has been increased from \$200,000 to \$400,000.

THE RUBBER TRADE IN BOSTON.

By Our Regular Correspondent.

FALL trade opens well in most lines of rubber business. In mechanicals the report is that the call for rubber belting is greater than a year ago, a fact that has been attributed to the great increase in cost of leather belting, material for which is fully double its normal price. But two leading leather belting manufacturers have told your correspondent that the demand for their product is up to the average, despite the high prices, so that the increased demand for rubber belting must be credited to a larger general demand for all kinds of belting, or to a conversion of users to a preference for that made of rubber.

* * *

There is a very general satisfaction shown by the trade that the new tennis footwear price lists, which appeared early last month, showed but a moderate increase over the figures of last year. The higher cost of cotton duck amply justifies the advance in footwear made from this material.

* * *

Speaking of cotton duck brings to mind that the steady increase in the use of automobiles, and the consequent present and prospective demand for tires, is a matter which is being given most serious consideration in the textile industry of New England. The production of fabrics suitable for the manufacture of tires has hitherto kept pace with the demand, but that it will continue to do so is an open question, for two reasons. One of these is the possible lack of supply of suitable raw material, and the other, the insufficient productive capacity of the factories equipped to make such fabrics. Of these mills, many are situated in this section, and are largely financed by Boston capital.

Many of the leading concerns, which specialize in auto-tire fabrics, have increased their capacity for such fabrics, while others have made preparations for doing so, but here they are finding a new difficulty, the inability of loom manufacturers to fill their orders promptly because of the increased demand. Among the most important of these enlargements is the building of the American Tire Fabric Co.'s factory at Newburyport by Boston and New York interests, in which a capital stock of \$1,500,000 is authorized by its charter. Another is the erection of another factory at the plant of the Manomet Mills at New Bedford, for which additional stock to the amount of \$1,000,000 has been issued. The Manhasset Manufacturing Co., of Putnam, Connecticut, is planning to nearly double its output of yarn for tire fabrics, and the Killingly (Connecticut) Manufacturing Co. has quadrupled its product of tire duck within the last two years, and it is reported, contemplates the erection of a yarn mill to supply the increased demands of its looms. The Atlas Yarn Co. has acquired a mill at Southbridge, Massachusetts, and is producing yarns specially for tire fabrics. Mention was made recently in your columns of the increase in capital of the Connecticut Mills Co. and the acquisition of the Nemasket Mill at Taunton, this state, where it will manufacture about one-half the yarn required for its weaving at Danielson, Connecticut. The West Boylston Co.'s factory at Easthampton, Massachusetts, is running to its utmost capacity on yarns and auto-tire duck. The Bay State Cotton Corporation, which completed a \$100,000 addition to its plant at Lowell about the first of the year, is now running exclusively on tire duck. The Katama Mills at Lawrence is a \$500,000 enterprise for manufacturing tire fabric.

Thus it will be seen that New England is fully alive to the importance of supplying proper fabrics for the production of automobile tires, and that large amounts of Boston capital are invested in this industry. Indeed, there is much Boston money in many similar enterprises outside of New England. But that is another story.

* * *

The Apsley Rubber Co. is doing some active advertising in New England. The writer visited Eastport, Maine, last month, and was surprised to note, on landing, that practically two-thirds of the people were wearing little celluloid flag pins bearing the Apsley trade-mark. A "fish fair" was in progress, which had all the earmarks of a county fair. The Apsley Rubber Co. had a working exhibit, two expert workers making rubber footwear, supplementing which was a full line of the Apsley specialties in boots, shoes and tennis lines. The "Rock Hill" boots made by this company are very popular with fishermen along the coast of Maine and as far as the Grand Banks, and at a drawing, bearing some resemblance to a lottery, the second and third prizes were a pair of these fishermen's boots and a pair of ladies' rubbers. Naturally the Apsley footwear got pretty extensive publicity in connection with this fair.

The Mishawaka Woolen Manufacturing Co., Mishawaka, Indiana, also had an exhibit at the Eastport Fish Fair, showing a full line of their "Ball Band" boots and rubbers. The B. F. Goodrich Co., Akron, Ohio, had a fine exhibit in the window of the principal shoe store.

At the county fair held at Barnstable, Massachusetts, The B. F. Goodrich Co. had an extensive and attractive exhibit of its many lines of footwear. This was under the personal charge of J. S. Capen, the director of New England sales. Mr. Capen seemed as popular among the fair visitors as he is with his customers, and the exhibit was a center of attraction during the few days the fair was held.

A recent discovery and an accidental one at that, which may be of interest to the rubber trade, is that of the finding of a deposit of fuller's earth, ranging in depth from 3 to 70 feet, in Stoughton, this state. The earth has been declared to be of excellent quality, and now, instead of changing the farm to a "bog" for the production of cranberries, a concern has been capitalized for \$75,000 under the name of the Stoughton Earth Co., to mine and market the product, which has been given the name of "Stoughton Flake."

* * *

The Plymouth Rubber Co., manufacturer of heels and soles, proofed fabrics and artificial leather, will soon erect a new building at its plant in Canton. It will be of concrete, two stories high, 100 by 150 feet.

* * *

Robert B. Baird, vice-president of the Rubber Trading Co., New York City, with Mrs. Baird, last month toured New England by motor, and visited many friends in this section.

* * *

One of the perils of making one's own cement was exemplified in the explosion which occurred at the factory of the Hazen-Brown Shoe Co. at Brockton one day last month. A large quantity of material being churned, caught fire, and in the consequent explosion one man was seriously burned, eleven others more or less injured or their clothing set afire, and the ell in which the machine was located was demolished, causing a loss of about \$10,000.

THE RUBBER TRADE IN RHODE ISLAND.

By Our Regular Correspondent.

THE activities of the rubber industry throughout the State continue to keep the several factories operating to their capacity and the orders on hand or in sight indicate steady work for an indefinite number of months. Large quantities of shoes, tires and other products are being daily shipped to all parts of the country, as well as to many foreign markets, the domestic demand being much greater than has been experienced in a long time. The shortage of help, which for several months has been a great problem and handicap with the different concerns, is as acute as ever.

* * *

The National India Rubber Co. has materially improved its plant at Bristol, and is still engaged in further additions and changes that are calculated to increase the size of its factory and to extend its facilities. At the present time approximately 3,500 hands are employed in the several departments. The factory resumed operations on Tuesday, September 5, after a two weeks' shutdown for the purpose of taking an account of stock.

Good progress is being made in the construction of the two-story brick addition to the vulcanizing department of the National company's plant, opposite the east end of Bourn street. This addition has a frontage of about 150 feet on Wood street and will be about 100 feet deep. As soon as the new structure is ready, a number of modern vulcanizers, and other machinery will be installed. A three-story brick building for a box shop is being erected on the site of an old structure, that will be 80 by 100 feet, with a tar and gravel roof, sprinklers and electric elevators. The company has also secured a portion of the old handkerchief plant, on South Main and Broad streets, Warren, that is to be used as an auxiliary storehouse.

* * *

At the monthly meeting of the Bristol Town Council in September the National India Rubber Co., upon its application through James W. Franklin, superintendent of the footwear division, was granted permission to lay a large sewer pipe from the factory on Wood street to the westward through Bradford street to the harbor. The company has for many years used

millions of gallons of salt water which is pumped from the harbor just south of the DeWolf Inn to the factory, and after being used is returned to the harbor. Trouble has been experienced for some time because of the failure of the present pipes to carry the water to the harbor, and the company is desirous of installing larger pipes, and thus overcoming the difficulty. The contract for the work has been awarded and it is proposed to lay iron pipes 22 inches in diameter.

The International Rubber Co. is operating its factory at West Barrington on an overtime schedule evenings, in an effort to catch up with rush orders, of which it has a large number on hand for carriage cloth, upon which the concern is at present specializing. The company has just completed an important addition for a new filter system. The addition is a wooden building, two stories high, and measures approximately 50 by 60 feet.

The new structure contains two sets of tanks, large enough to take care of all the waste from the dyeing vats during the day. Each day the waste is carried into one set of vats. The day after it reaches the filtration building the liquid is first treated with chemicals and then is pumped to the presses where much of the sediment and precipitation is eliminated. The liquor is then conducted by pipes to another tank and is passed over the sand filters. When it passes through this operation it is purified and its color has been changed from an inky black, in which condition it leaves the dyehouse, to clear water.

The installation of this system was made necessary because of complaints that were made from owners of oyster beds near the outlet of the stream into which the company's refuse water flowed. Suits were brought in the State courts against the International Rubber Co. and another corporation, with damages aggregating \$100,000. These were finally settled and the concerns agreed to take such preventive measures as would be necessary to eliminate the contamination.

Frank B. Wilson has resigned the position of receiving clerk and storekeeper at the factory of the National India Rubber Co., Bristol, after a long term of service, to accept a similar position with the Lee Tire & Rubber Co., at Conshohocken, Pennsylvania, taking up his new duties early in September. Mr. Wilson had been employed by the National India Rubber Co. for nearly 30 years, 22 of which were in the position he has just resigned. He had charge of the raw material in the company's storehouse.

The Bourn Rubber Co., Warren street, Providence, is so driven with orders in practically all of its departments that it is constantly hiring additional help as fast as they can be placed and broken in. This is especially true in the lumbermen's and arctic departments. The firm is advertising for rubber shoe and quarter makers and is also taking on a number of learners.

The factory of the Narragansett Rubber Co. at Bristol closed on August 31 and reopened the day after Labor Day. During the shutdown the machinery was given a thorough overhauling and a number of repairs were made. The factory is very busy on orders and has enough work in sight for at least six months or more to come. Additional help is being constantly hired for all departments.

An addition that will entirely alter the appearance of the factory is being erected in connection with the main building at the Knightsville plant of the Atlantic Tubing Co. The new portion will cover in the big water tank at the top of the old structure that has been such a prominent landmark. The company reports an unusually busy season since something over a year ago.

Roswell C. Colt, who has been spending his vacation with his mother, Mrs. Samuel P. Colt, at her home in Bristol, has returned to Montreal, Canada, where he is purchasing agent of the Canadian Consolidated Rubber Co., Limited.

John J. Farley, formerly foreman of the mechanical department of the National India Rubber Co., Bristol, but now manager of the Milwaukee, Wisconsin, branch of the Federal Rubber Co., has been spending his vacation with his mother at Bristol.

THE RUBBER TRADE IN TRENTON.

By Our Regular Correspondent.

A LITTLE army of machinists will be put to work probably within the next two or three weeks installing tire-making equipment in the new addition of the Ajax Rubber Co., which is now rapidly nearing completion. The addition is three stories high. It is 350 by 60 feet and will enable the company to devote an extra 63,000 square feet of floor space to the making of the famous Ajax tires. A new engine room 50 by 100 feet has also been erected. An overhead bridge connects the new addition with the main factory, which is on the opposite side of the street.

* * *

The Thermoid Rubber Co. is justly proud of the record made by its brake lining, used on the car in which S. B. Stevens recently completed a trip from New York to San Francisco. The journey was made in the remarkable time of 5 days and 18½ hours. Thermoid brake lining was used for the cone clutch and "Thermoid 100 Per Cent" for the brake lining. In addition to giving perfect service on the trying journey the lining was in excellent condition at the end of the trip.

* * *



The rubber industry of Trenton will be widely advertised, in the near future, by means of miniature posters or stamps to be affixed to the outgoing mail of every concern connected with the trade. The poster, which is in three colors, shows a tire, in the center of which is the figure of a *seringueiro* tapping a rubber tree. It is estimated that hundreds of thousands of these stamps or posters will be sent out from Trenton in the next year, thus giving wide publicity to the importance of the rubber industry in this city.

The Post Tire and Rubber Co., which sent out a circular letter to prospective stockholders, intimating that it would consolidate three tire-making plants in Trenton under one head, has evidently met with disaster. When the representative of THE INDIA RUBBER WORLD called at the offices of the concern to learn what progress had been made in the consolidation plans, he was confronted with a notice tacked upon the office doors announcing that the bank officials had obtained a distraining order covering the office furniture for rent alleged to be due. President Post, who, it is said, came here from Washington, D. C., to promote the business, could not be located. One of the companies it was planned to take over (according to the circular) announced that the first intimation it had of such a move was contained in an unauthorized statement in the letter seeking stockholders.

* * *

The Semple Rubber Co., which makes tubes exclusively, is steadily forging ahead. It was necessary recently to take over additional room for manufacturing purposes. Charles Semple, president of the concern, is a rubber man of many years' experience. He has reduced the making of tubes to a scientific basis. The uniform success that has attended his efforts seems to point

the way to a volume of business which is likely to outgrow the firm's present quarters in the near future.

* * *

Superintendent Metzler, of the Goodyear Tire and Rubber Co., Akron, Ohio, was a recent visitor here. He renewed many friendships with rubber men. Mr. Metzler was connected with the Hamilton Rubber Co. several years ago.

* * *

Frederick F. Katzenbach, vice-president and treasurer of the Katzenbach & Bullock Co., has returned from a vacation spent in the Adirondacks and along the Mohawk Trail.

* * *

A delegation of Trenton public school teachers was taken on a tour of inspection of some of the rubber mills a few days ago. The school board considered that in view of the important position occupied by rubber manufacturing in Trenton it would be well for the teachers to know something about the process of making it.

FIRST AID IN ELECTRICAL SHOCK.

The extended use of electricity in rubber mills, and the possibility of accidents makes interesting the following first aid treatment for electrical shock: Raise the limp body by the ankles with the whole weight resting on the neck, and then let it fall; hammer the soles of the feet without removing the shoes; pull forward the swallowed tongue. Such treatment frequently brings the injured man to consciousness. [N. E. L. A. Bulletin.]

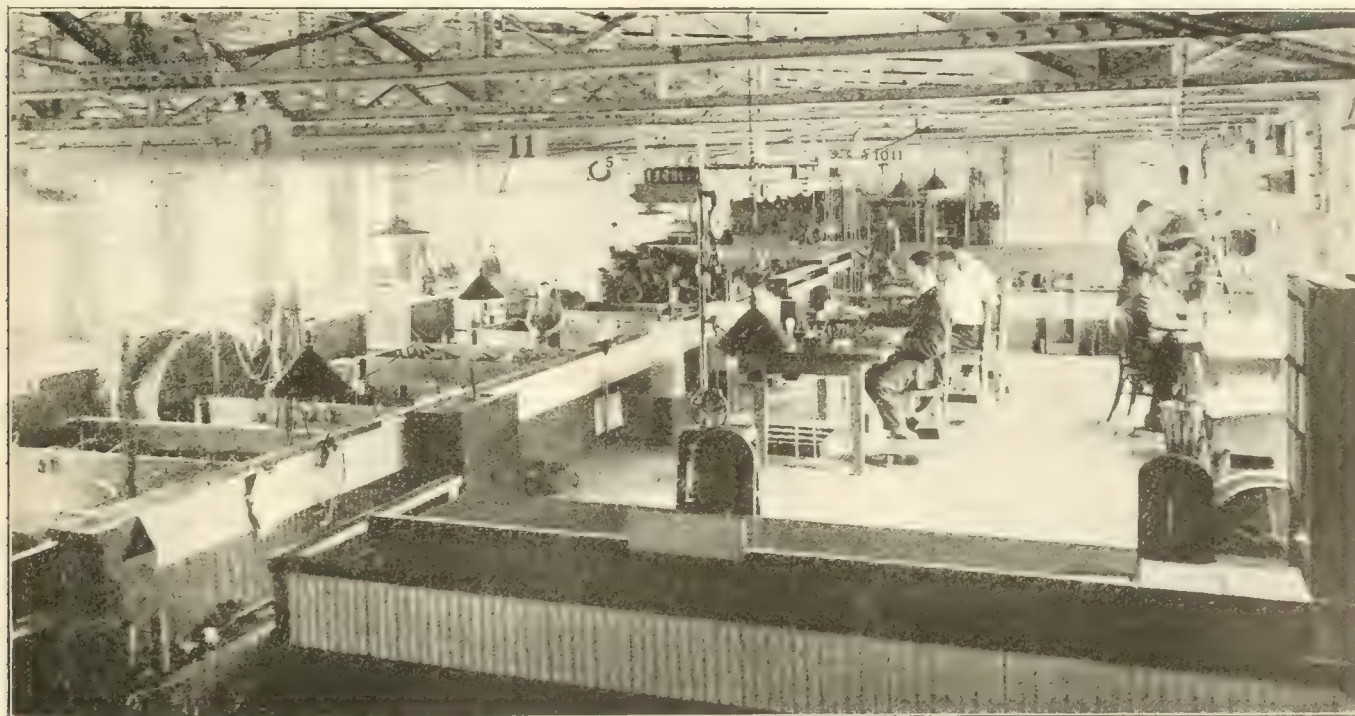
RUBBER STAMP PRICES REDUCED.

THE Traun Rubber Co., New York City, has sent out a new price list, showing a material reduction from former rates. The various kinds of stamp rubber, including the different degrees of hard and soft, red, white and oil proof, are now quoted at from 70 cents to \$1.50 per pound for regular stock gage (14 Stubbs or 12 B. & S.). Other thicknesses rolled to order at special rates. Rubber dam, manufactured expressly for making molds, is quoted at \$1.45 per square yard. Printing type compounds $\frac{3}{8}$ inch in thickness now range from 40 to 80 cents a pound.

Sponge rubber is offered at varying prices, according to amounts ordered. Quotations here given are for single pounds, with a considerable reduction on 10-pound and 25-pound lots, and still heavier discount on 100-pound lots. For instance, sponge rubber in 20 by 24 inch sheets, $\frac{1}{8}$, $\frac{3}{16}$, $\frac{1}{4}$ and $\frac{3}{8}$ inch thick, is quoted at \$1.25 per pound; for 10-pound lots, the price is \$1.05 per pound; 25-pounds cost 90 cents a pound, and 100-pound lots are listed at 85 cents. Similar reductions are shown in quotations of other sponge rubber, the single pound prices being as follows:

One-half inch thickness, in sheets.....	\$1.75
Sponge rubber strips, 16 inches long, machine-cut from sheets, any width, $\frac{1}{8}$ to $\frac{3}{8}$ inch thick.....	1.35
Sponge rubber for artists' use, in slabs 14 by 16 inches, unskinned, $\frac{1}{2}$, $\frac{3}{4}$, or 1 inch thick.....	1.75
Sponge rubber, skinned, as above.....	1.85

Prices of other varieties of rubber for stamp manufacturing purposes are unchanged.



INSULATED WIRE TESTING LABORATORY OF FLETCHER CABLE CO. BRIDGEPORT, CONNECTICUT

AN INSULATED WIRE TESTING LABORATORY.

More important than any other department in an insulated wire or cable factory is the testing department. No expense is spared in equipping it with delicate and accurate instruments that instantly detect faults, and that measure with wonderful exactness the insulation that the rubber covering affords. This work is in the hands of expert electrical engineers, and records for every foot of rubber covered wire are taken. While this work was brought about primarily by insurance interests, the manufac-

turers have not only met their specifications, but in their search for perfection have bettered the requirements by a large margin. So it comes about that laboratory, mill room and particularly the testing room in insulated wire work are keyed up to the best and highest efficiency.

Speaking again of the testing room, its equipment, in part, consists of galvanometers and Wheatstone bridges, high voltage testing sets, machines for testing rubber, and fabric and yarn testing machines.

The India Rubber Trade in Great Britain.

By Our London Correspondent.

THERE are no complaints to be heard regarding the general volume of trade. Although a period of something like slackness has been experienced, owing to cessation of government orders, these have now come in again, a fact which supports the general opinion that hostilities are now expected to last well into next year, instead of coming to an end by Christmas. The movement in favor of protective duties is being energetically pursued, but it may be remarked, that although those of the free trade persuasion are not making much noise at present, they certainly intend to assert themselves when legislation comes to the fore.

A matter which is likely to be of even greater moment is already attracting a good deal of attention, namely, the future of labor. There is no doubt a difficult time before the employer, as it is recognized that the present high wages being earned up and down the country will be desired as a permanency by labor, and be objected to by the employers. The appointment of Mr. Henderson, a cabinet minister, as labor adviser to the government is a sign that trouble is apprehended. At any rate the appointment is a recognition that the relation of master and man is likely to undergo a change in the future. It rather looks as if the masters will be allowed to make a certain profit to be agreed upon, the rest of the profit to go to the men. This would be an extension of the profit-sharing schemes which are already in operation at a few large works. The question arises, however, will the capitalist care to conduct business on these lines, or will he think it preferable to invest his money in securities and live a life of leisure, or at any rate, one free from the recurrent anxieties of business?

RECLAIMING TEXTILES AND RUBBER

Several patents have had as their object the recovery of the textile material as well as of the rubber from rubberized fabrics, but I do not think that any have proved commercial successes. The latest patentee in this direction is Charles de Villers, of Neuilly-sur-Seine, France,* who treats the fabric with tetrachlorethane at its boiling point, whereby the rubber goes into solution, leaving the fabric unaffected. The solvent having been removed by distillation, the rubber is obtained of a quality quite comparable to best quality fresh rubber. This latter phrase always appears in reclaiming patents, but rarely with strict propriety. However, a friend of mine who has seen some of the rubber, was struck with its quality, and I understand that it is about to be put on the market. Cotton fabric has generally been considered not worth recovering, but the present price of cotton is in favor of any recovery process. The difficulty about wool has always been that to be salable it must be absolutely free from particles of rubber, a result which does not seem to have been attained in previous patents. Perhaps this patent will solve the problem.

NITRE CAKE IN RECLAIMING

The article in the August issue of THE INDIA RUBBER WORLD on the use of nitre cake in reclaiming has naturally attracted attention on this side, as the price of mineral acids is much higher than in pre-war times. Moreover, nitre cake, like cinders, can be had for the removal, if one is lucky enough to find a horse and cart available. Large quantities of this by-product of the nitric acid manufacture have been thrown into the sea, though recently, owing to the offer of a prize for a process whereby it could be utilized, it has found some applications.

The article does not say what it costs delivered to the American works, which are stated to have used it successfully, but, anyhow, in the ordinary acid reclaiming of textile cuttings, the cost of the acid is not a large matter when the selling price of the reclaimed is considered.

RECLAIMING NOTES

The Xylor Rubber Co., of Trafford Park, Manchester, shows continual development and I understand that extension of premises is considered inevitable. The reclaiming of red rubber is now a special feature of this works, very satisfactory results having been obtained.

Dilution of labor owing to the necessities of the war, that is, the replacement of men by women, has recently been adopted in reclaiming works to such extent as has been considered advisable, due regard being paid to the risks involved. With regard to this I hear that the factory inspectors have been much impressed by the automatic cut-out switch which is one of the advantages of the electric driving of rubber rolls.

BUSINESS AND PERSONAL NOTES

I notice with regret the announcement of the death of Percy Carter Bell, who was better known in American rubber circles than in England owing to his long business life in New York City. The son of the late J. Carter Bell, public analyst for Cheshire and Salford, he obtained his first knowledge of rubber from his father, and at the works of I. Frankenburg & Sons, Limited, Salford, prior to Dr. Weber coming upon the scene.

J. C. A. Ward, chairman of Callender's Cable Co., is to represent the employes' side on the special tribunal to hear appeals of railway men with regard to military service.

The act extending the provision relating to unemployment insurance to rubber workers came into force on September 4, and at a special conference held previously in London, the rubber industry was represented by James Tinto of the Irwell and Eastern Rubber Co., Limited; Mr. Wilson, secretary of the India Rubber Manufacturers' Association; H. H. Duke, national organizing secretary of the Amalgamated Society of Rubber Workers, and A. Allison, London organizer of the same society. The trade generally appears to be against this extension of the act, mainly because of the difficulty in defining a rubber worker, and also because of the additional clerical labor which will devolve upon depleted office staffs.

Motor *char-à-bancs*, which have come into increasing use and size at tourist resorts during the last few years, were stopped by government order on September 1, on account of the scarcity of petrol, in which term is included any mixture containing hydrocarbons.

The Wood-Milne Co., Limited, like the North British Rubber Co., Limited, and the Dunlop Rubber Co., Limited, has found it necessary to extend its tire manufacturing premises. The company is now building a new works, having bought some extra land at Sandy Lane, some hundred yards distant from the present works at Leyland. The new works is to be devoted to the production of solid band tires and pneumatics.

Vacuum driers made by the J. P. Devine Co., Buffalo, New York, are giving great satisfaction to reclaimers here. With their use there is no need to go to the extent of drying necessary in the case of raw rubber, as several per cent of water can be left in the rubber, to be entirely removed in the subsequent process of sheeting on the rolls.

Determinations of specific gravity are frequently required in reclaiming works, and it may not be out of place to mention

*Noted in INDIA RUBBER WORLD, MAY 1, 1916, (page 41).

that the gravitometer made by Eimer & Amend, New York City, and featured in Mr. Pearson's book, "Rubber Machinery," is in regular use at one of our largest works. So far I have not heard of its being in use at any of our rubber factories.

SOME FOREIGN RUBBER INTERESTS.

THE American Consul-General in Sidney, Australia, reports that an American salesman visiting his post stated that he had secured orders for \$300,000 worth of rubber tires in Australia.

According to a report by the British trade commissioner in Australia the total imports of rubber goods into that country during the first three months of 1916 amounted to £278,474 [\$1,355,194], of which £130,245 [\$633,837], more than 45 per cent, were from the United States. The balance was shared as follows: British Possessions, £85,437 [\$415,779]; Great Britain, £62,167 [\$302,536], and Japan, £625 [\$3,042].

The French Government has recently placed an export embargo on talc.

The Russian Minister of Finance has decided that the certificates of origin now required for nearly all articles imported into Russia may be dispensed with in the case of samples of no commercial value. Such samples are exempt from import duty.

The American Consul at Saloniki, Greece, reports that several lines of American goods have been recently introduced there and that the Municipal Hospital has placed an order for \$100 worth of American rubber gloves.

According to a recent report of the American Vice-Consul at Singapore, Straits Settlements, there is a great future for automobiles and motor trucks in those states.

The country is at present in a fine financial condition, due to the high prices for rubber and tin, the two leading exports. The greatest drawback to the rapid growth of the automobile trade is the lack of ocean tonnage.

Rubber tires cost approximately 15 per cent more than in America.

The Swedish War Trade Law of April 17, 1916, made it illegal for an importer in Sweden to furnish an exporter in Great Britain with information as to the disposal of goods.

The British exporter was therefore often obliged, in reply to challenge of the British Customs, to admit that he was unable to furnish the evidence required from him and was thus exposed, through no fault of his own, and simply by the operation of the Swedish law, to heavy penalties.

These circumstances led the British Government to issue a Royal Proclamation prohibiting the exportation to Sweden of all commodities, and now, apparently as a result of the British export embargo the Swedish Government has placed an export embargo on the following articles containing rubber:

"Hose, transmission and conveying belts, whether sewn or not, heddles and other cotton articles containing rubber; tissues and other textiles not containing silk, impregnated or covered with rubber, or attached by means of rubber solution or layers of rubber."

RUBBER SEED OIL.

According to advice from the Far East, the Government of the Federated Malay States has decided that no export duty will be imposed in respect to rubber seed oil or products for a period of ten years from June 9, 1916. The object of this decision is to encourage the local industry of extracting oil from rubber seed and the preparation of this oil and residues or other products of the seed for the market.

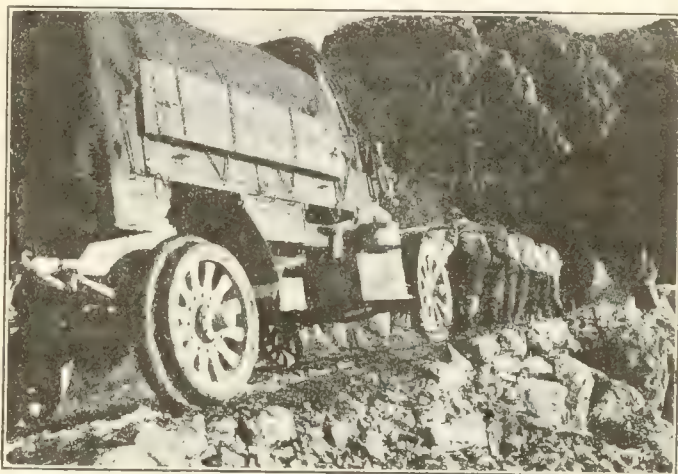
THE RUBBER TRADE IN GERMANY.

By Our Regular Correspondent.

GENERAL conditions are better than one would expect under the circumstances. Many factories are working overtime, and a number of concerns have greatly enlarged their plants, while others have entirely changed the character of their products, adding new machinery and adopting new processes to meet the demands created by the war.

Labor conditions, generally speaking, continue excellent. The machine and metal industries have been specially favored by the military authorities on account of the importance of having skilled mechanics in those shops which are working on war contracts. The same applies to certain branches of the rubber industry.

There is a scarcity of skilled and also of unskilled labor in some districts, where the industries are not suited to the employment of women and disabled soldiers, and where war



AUSTRIAN ARMY TRANSPORT MOTOR TRUCK. NOTE THE WORN STATE OF SOLID RUBBER TIRES.

prisoners are not available. For a time the government allowed furloughs to soldiers needed for work at home, but of late the pressure at the battle fronts has become so formidable that this course can no longer be followed.

There is plenty of money in circulation, and the financial situation is far better than conditions would lead one to expect. Savings deposits show an increase.

Manufacturers of aeroplanes, motor vehicles and electrical supplies continue very busy with war contracts, and in producing stocks to be held in reserve in anticipation of a demand for cars upon the cessation of the war.

The building trades are most severely affected by the war. No new work is started, architects and builders being occupied with the slow completion of old contracts and a few factory extensions mentioned above.

The brewing industry, which has always been a large purchaser of rubber goods, is suffering from the lack of raw materials and the restrictions placed on the consumption of its products.

INCREASED COST OF LIVING.

Notwithstanding the fixing of maximum prices for foodstuffs by the authorities, the regulating of the consumption of such products and the control of distribution by the system of sales against supply cards, furnished monthly to each inhabitant, the cost of living in our large cities and industrial centers has increased more than 50 per cent within the last year. This is chiefly due to the poor crops in 1915. This year, owing to careful fertilization and the more abundant supply of labor, afforded by war prisoners, together with more favorable climatic conditions, more abundant crops have been produced, and it is

hoped that the government will not experience too great difficulties in furnishing an adequate quantity of foodstuffs within the means of our laboring classes.

TRADE CONDITIONS.

Domestic trade has either been greatly curtailed or radically altered in character, while our foreign trade is greatly lessened. We cannot carry on normal business relations with the Americas and other countries beyond the seas, but trade is fair with Austria-Hungary, Bulgaria and Turkey. A regrettable development is that neutral countries, like the Netherlands, Scandinavia and Switzerland, to whom we can make deliveries, are neglecting our markets, obeying, doubtless, the demands of our island enemy.

RAW MATERIALS.

The blockade has stopped or greatly diminished the amount of raw materials, which we imported in vast quantities before the war, and such materials are scarce and very costly now that the stocks most manufacturers had in reserve have become exhausted.

As has been reported in previous letters, the government placed many restrictions upon the use of raw materials in manufacture. Production is limited on all articles except those needed by the government.

CRUDE RUBBER.

Although small quantities of crude rubber are constantly arriving, they have little or no effect on the market for this commodity. Prices continue very high, from 30 to 40 marks per half kilogram [\$7.14 to \$9.52 per pound], according to quality.

Reclaimed rubber and the artificial sorts also obtain very high prices, the latter being as costly as the natural product and finding a market only on account of the present abnormal conditions.

Rubber substitutes sell at from 2 marks to 2.50 marks (40 to 40 cents) a pound.

Unusually high percentages of reclaimed, artificial and substitute rubber are being used in compounds for rubber goods for the army and navy. No crude rubber is allowed for private use, and substitute qualities are alone available for this purpose. Reclaimed rubber is used very extensively, mostly for military requirements, in spite of its quality, which is leaving more and more to be desired.

COLLECTION OF RUBBER WASTE.

The government has ordered that any quantity of rubber, either crude or vulcanized or reclaimed, exceeding 1 kilogram (2.20 pounds) in weight, is to be turned over to the concerns designated by the Rubber Clearing House. The names of these concerns were published in the August 1916 issue of THE INDIA RUBBER WORLD.

All rubber scrap must be sent to the nearest of these dealers and the cost of forwarding is refunded to the shipper. Rubber scrap is classed in 35 grades and payment is made according to the schedule published.

The least valuable grade is made up of cycle tire beads. Hard rubber is not purchased, nor is armored hose, except when the wire has been removed from the latter.

Rubber thread waste is paid for at the rate of 40 cents per pound; rubber footwear at 15 cents a pound; inner tubes fetch 70 cents, if soft and in good condition; if crusty, only 30 cents a pound.

The soldiers at the front are doing much good work in collecting waste rubber, as well as other kinds of waste materials.

These prices may appear extraordinary to your readers, but they must remember that we are living under conditions far from normal.

The cost of the war will be paid by future generations, and this burden will be only a slight reminder to them of the sacrifices and privations endured for them by their ancestors.

Rubber Planting Notes.

CRUDE RUBBER INDUSTRY IN BURMA

According to a report from the Netherlands Consul at Rangoon, the total exports of crude rubber from Burma during the fiscal year 1915-16 amounted to 1,285,984 pounds.

The following table shows the area under rubber cultivation in Burma and the amount exported in the past five years, as given in the Report of the Maritime Trade and Customs Administration of the Netherlands.

Year	Area under cultivation (hectares)	Amount exported (pounds)
1911-12	1,100	1,100,000
1912-13	1,200	1,200,000
1913-14	1,300	1,300,000
1914-15	1,400	1,400,000
1915-16	1,500	1,500,000

As a result of discussion at the beginning of the fiscal year 1915-16, between the Lieutenant-Governor of Burma and representatives of the Lower Burma Planters' Association, the rules regulating grants and assessments of land for rubber cultivation in Burma have been considerably modified. The planters represented that the extension of rubber growing was being hindered by the liability of rubber estates, leased under the rules then in force in lower Burma, to a land revenue assessment which might rise to as much as 25 rupees (83 cents) an acre.

Accordingly, a revision of rules was agreed upon, providing for the issue of grants instead of leases, and the levy of royalty on the net value of the rubber, combined with a moderate revenue assessment, instead of the previous liability to land revenue, the rates of assessment to be reconsidered every 20 years.

This new rule only affects lands granted for rubber cultivation on and after July 1, 1916. For land granted or leased under previous rules, certain abatements of royalty and land revenue assessments are allowed, and owners are offered the opportunity of surrendering their land at any time in the next ten years, and of taking out a grant under the new rules.

Experience is said to show that large areas in Burma are suitable for rubber cultivation, and the joint committee, formed to draft the foregoing rules, considers that an estate in full bearing should yield not less than 350 to 400 pounds of rubber per acre.

EXPORTS OF CRUDE RUBBER FROM MALAYA

In his report for 1915, the Director of Agriculture, Federated Malay States, says: "The rubber crop for the Federated Malay States is returned at 36,380 tons, and to this must be added 6,666 tons from the unfederated states under British protection. It would probably be safe to add 8,000 tons for the colony, making a total of about 51,000 tons for Malaya. But it must be remembered that these returns only include properties of 100 acres or more area, and no account is taken of the output of rubber from small holdings. The export returns of the commissioner of trade and customs show that 44,523 tons of crude rubber were exported from the Federated Malay States in 1915. I have no reliable figures at present of the export of rubber from the colony and the other states of Malaya, but from

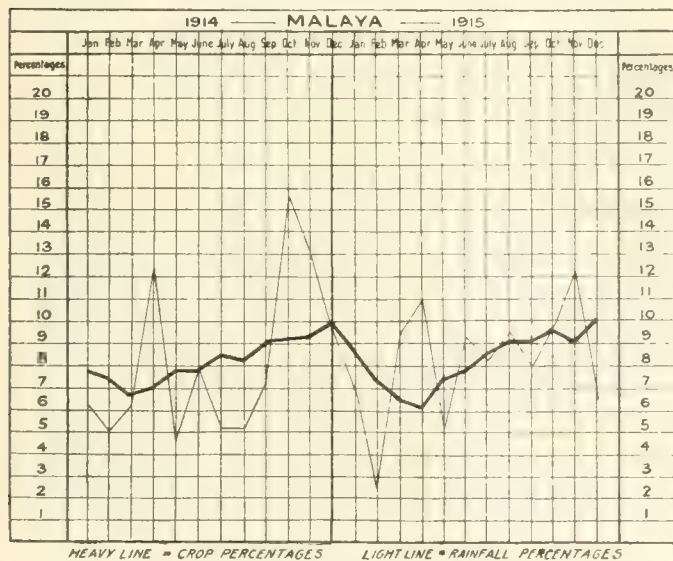
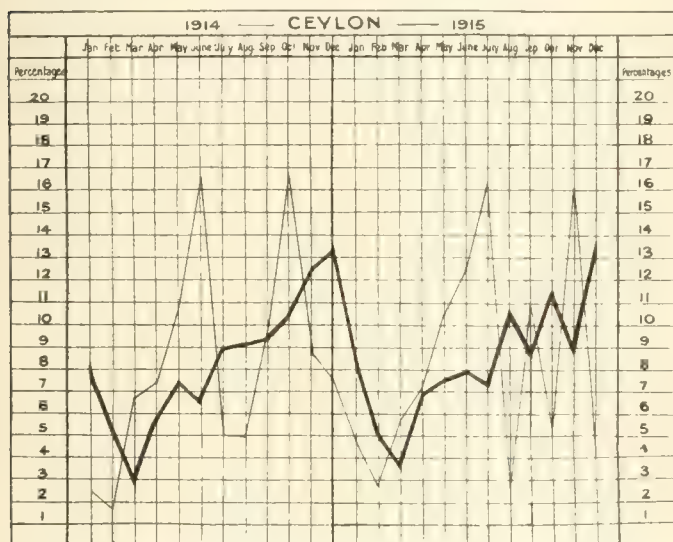
such facts as are available it is certain that it cannot be less than 24,000 tons, making a total export from Malaya of more than 68,000 tons."

CRUDE RUBBER EXPORTS FROM MOZAMBIQUE.

The American vice-consul at Lourenco Marquez, Portuguese East Africa, reports that the total exports of crude rubber from Mozambique during the year 1915 amounted in value to \$20,115.

CROP AND RAINFALL PERCENTAGES IN CEYLON AND MALAYA.

FRANK G. SMITH, secretary of the Rubber Growers' Association, London, England, has sent to the members charts and statements showing the percentages of crop



HEAVY LINE = CROP PERCENTAGES LIGHT LINE = RAINFALL PERCENTAGES

CHART SHOWING PERCENTAGE OF CROP HARVESTED, AND OF RAINFALL RECORDED MONTHLY IN 1914 AND 1915, BY REPRESENTATIVE ESTATES IN CEYLON AND MALAYA.

harvested, and of rainfall in 1913, 1914 and 1915, recorded monthly by a number of estates in Ceylon and Malaya. These are, as far as the two first-mentioned years are concerned, duplicates of the charts which were reproduced in THE INDIA RUBBER WORLD of January 1, 1916. The 1915 figures, together with those of 1914, are shown graphically on that portion of the charts reprinted here.

As in previous years, there is shown a very general resemblance or parallelism between the rainfall and the crop, though sometimes the fluctuations of the latter follow rather than coincide.

The Malaya chart shows great regularity in the movements of the crop curve during each of the three years.

The Ceylon chart for 1915 shows very clearly how the crop fluctuates with the variations in rainfall. It will be noticed, however, that the prolonged dry period from November, 1914, to February, 1915, had a much greater effect on the crop than the briefer dry spells in August and October, 1915.

Ceylon's heaviest yields in 1915 were August, 10.56 per cent; October, 11.30 per cent, and December, 13.72 per cent. March made the lightest showing, 3.62 per cent of the total crop. Malaya did not show such heavy fluctuations, the lowest yield being 6.33 per cent in April, and the highest 10.10 in December.

Taken as a whole, the graphic lines follow, in a general way, those of previous years, though the rainfall in Malaya at no time in 1915 reached as high a percentage in any one month as in the two previous years.

THE RUBBER TRADE IN MALAYA.

By Our Regular Correspondent

THE London rubber market has a grievance against Singapore, a grievance which is being voiced vigorously in the financial press. The complaint is that the Imperial Government, while forbidding the export of rubber from London to America and other neutral countries, allows the export from Singapore, with the result that Singapore is rapidly becoming the world's rubber mart and the London market is declining in importance. From the local point of view this is just as it should be. It is felt that Singapore is in every respect best suited to be the center of the world's rubber trade and the sooner it becomes recognized as such the better for the Straits Settlements and Malaya and the rubber industry as well.

When the war broke out Singapore had its great chance. Hamburg ceased to count, the London market scarcely knew what course to take, but Singapore had the rubber and the buyers, and the ability to ship east or west to the great centers of consumption. Now Singapore has the biggest open market in the world, and business can keep going without war restrictions. Moreover, freight conditions, to a large extent, force rubber from Java and Sumatra to pass through Singapore, where it is subject to the system of export permits adopted to check the export of British or other rubber to Britain's enemies.

The London dealers are greatly concerned, but it would seem that their efforts to check the development of the Singapore market have altogether failed. Even without the war, the decline of the London market was certain, though it would have been a longer process; but as things are, the pace at which Singapore has forged to the front has been wonderfully rapid. With exports practically free here, but restricted in London, the obvious policy is for the bulk of the sales to be made in Singapore, thus preventing shipments to London growing to an extent to cause a glut, and a consequent fall of prices.

London critics say further that by present arrangements Singapore is playing into the hands of German-Americans, whatever this may mean. It is mere clap-trap, however, for whatever German-American influences exist are much more effectively combated here than in London, according to local opinion, for in Singapore such movements are more easily watched and checked. It is certain that American capital is taking a lively interest in the rubber trade; indeed, it would be astonishing if this were not so, and owners of rubber plantations in Malaya, when they get definite offers for their property, are not inclined

to look at these propositions from a purely business point of view. The political question is one for statesmen. When it looks as if such sales might be harmful to national interests, it is for statesmen to step in and make such rules and regulations as are thought to be necessary. A rubber plantation remains British as long as it is on British soil, and is thus under the control of the British Government. The capital may be foreign, but the produce is here, and its disposal is thus under British control. There is plenty of German money in rubber plantations, but this does not help Germany to get rubber at the present time.

A recent report on the Federated Malay States showed that at the end of 1915 the total area of rubber estates of more than a hundred acres in extent was nearly 500,000 acres, of which the producing area was about 281,130 acres, an increase of nearly 66,000 acres on the previous year. The amount of rubber exported was 44,523 tons, of an estimated value of \$93,660,621 (the local dollar is worth 2s. 4d.). This was an increase of nearly 14,000 tons compared with 1914, and it is estimated that this year about 60,000 tons will be exported. It is to be noted that this is from the Federated Malay States alone, and there is an appreciable production in the Straits Settlements also.

Considerable comment has been aroused by a statement by a correspondent in a London financial paper to the effect that planters are taking advantage of the present abnormal times, when estate staffs are reduced to a minimum on account of so many men having joined the army, to try and force the hands of directors. It is alleged that they are sticking out for big increases in salary and highly favorable agreements under threat of throwing the work up, if their demands are not complied with. Correspondents have not been slow in taking up the cudgels on the other side, and on behalf of the planters it is pointed out that those who have stayed behind rather than accompany their comrades home to join up, would usually much rather be fighting than planting, and if all the men who wanted to go had gone, a good many estates would have come to a standstill.

It may be that some have asked for increased pay, but then, in a good many cases they are doing double work, which was not specified in agreements. Again, it must be remembered that before the war directors had things very much their own way. It was easy to get men with no previous experience to act as assistants on estates at a cheap wage, with the consequence that the rates of pay tended to go down, and often at the end of a four years' agreement, a man, if he was unable to get the management of an estate, found himself on the same level as a new man brought out from home, who had never seen a rubber tree before. The war is making a great many changes. If it renders cheap white labor an impossibility in the future it will have done one good thing.

RUBBER ADULTERATED WITH STARCH.

B. J. EATON, chemist of the Department of Agriculture of the Federated Malay States, reports in the "Agricultural Bulletin of the Federated Malay States" on a curious case of adulteration of rubber.

A peculiar specimen of rubber was received by Mr. Eaton from the Secretary of the Johore Planters' Association. It consisted of a thin sheet resembling a piece of drab-colored leather or hide. The rubber was easily torn and had a pure white interior, resembling flour. On examination the sample was found to contain a large quantity of starch, which was probably tapioca starch. It was found impossible to estimate the starch by washing it out on the crêping machine, the rubber refusing to cohere on the machine and becoming a mass of crumbs, the particles being washed through the sieves and lost. By boiling the rubber in dilute hydrochloric acid and subsequently in pure water and by crêping it on a small experimental crêping machine with hot water, a fairly coherent sample was obtained, which could be subsequently crêped and washed with cold water on an ordinary

factory crêping machine and converted into a thin crêpe on a factory sheeting machine. Even after this treatment the rubber resembled lace and was very weak. The loss on treatment, which probably consisted almost entirely of starch, was 50.9 per cent.

It had been previously reported to Mr. Eaton that starch, in the form of tapioca or sago, which is easily obtainable locally, was probably used by contractors' tapping coolies on estates where contract tapping exists. The managers of such estates pay on the wet weight of rubber collected, making an allowance for the water content of the sheet of rubber obtained, the sheets being weighed some time after being machined and hung to drain. If starch be used as an adulterant, it absorbs a large proportion of water and the manager pays not only for the added starch, but for water, since the wet sheets, on drying, lose much more weight than would normally be allowed for. The sample reported on was, however, the first in which starch had been discovered, although two suspected samples from another estate were received some time ago, in which no starch was found.

Mr. Eaton believes that the large amount of starch found in this sample, which was taken from a parcel of rubber from Johore consigned to Singapore and sold at the auctions there by a Chinese, would suggest that the adulterant was deliberately added for selling purposes.

This information should be a warning to planters who use contract tappers to look out for adulteration of this nature. It would probably be easily detected in sheet rubber when dry, but not in crêpe, since the starch would probably be almost entirely removed on the crêping machine, when fresh coagulum is washed.

Mr. Eaton suggests the use of the standard test for identifying the presence of starch, which is to add a few drops of a dilute solution of iodine to the suspected sample of rubber or latex, when a blue color will be produced.

[In connection with this report it is interesting to refer to the ancient practice of adulterating Brazilian rubber with flour or *farinha*, which is described at length in "The Rubber Country of the Amazon," by Henry C. Pearson.

In Para, the principal rubber market of Brazil, rubber houses employ a very capable body of men, who receive the rubber, cut and examine it, and pack it in boxes for shipment. The cutting of the rubber, he says, "is an absolute necessity, as some lots are badly adulterated. This adulteration takes three forms: In one, a substance, *tabatinga*, is added to the latex, giving a short-fibered rubber that is wholly without nerve. The second is the addition of *farinha*, which increases bulk and weight, and also makes the rubber very short and pasty. The third is a mixture of sand and *farinha*, which is, perhaps, the worst of all."

Mr. Pearson, in this book, tells us that the adulteration of fine Para by the addition of *farinha* was reported by Herndon as far back as the early '50s. "The gatherer does not put the *farinha* in altogether for the sake of adding weight; its presence causes a quicker coagulation, and if he gets a little too much he adds a little lemon juice and is able to produce exceedingly smooth films, free from bubbles, and very quickly."

"*Farinha*-adulterated rubber looks beautiful until red ants burrow into it and eat the *farinha* out. Then when the rubber *pelles* are cut open the whole fraud is apparent and the adulterated rubber is rejected. Sometimes the rubber is shipped before the ants get a chance at the *farinha*, and it is necessary for the rubber manufacturer to know whether it is there or not, as the strength of the rubber will show an extra shrinkage if it is present."

Mr. Pearson recommended a very simple test, which is to have a water solution of iodine and potassium iodide, which may be applied with a brush to the freshly cut surface. If *farinha* is there the surface will turn from a yellowish mahogany color to blue.]

FACILITIES FOR RUBBER TESTING IN THE EAST.

The Department of Agriculture of the Federated Malay States is now equipped to vulcanize, test and report on samples of rubber from any plantation estates.

Samples of rubber are sent to the Department of Agriculture, together with particulars of methods of preparation, and the results of tests are reported to the estate sending in the samples. No doubt these reports will be in the course of time published in bulletins for public information and benefit.

Mexican Rubber Notes.

THE position of rubber producing companies in Mexico, at the present time, is far from encouraging. Recent proceedings bring into prominence the insecurity of such enterprises in the United States. The affairs of two such companies serve to emphasize this.

PROPERTY SEIZED BY GOVERNMENT

The Conservative Rubber Co. was incorporated under the laws of Arizona in October, 1901, the capital stock being \$1,200,000, consisting of 6,000 shares at \$200 per share. These were marketed on the monthly payment plan. The principal office is in San Francisco. The property consists of large tracts in the states of Tabasco and Chiapas, Mexico, in which there are some wild rubber trees, and on which the first planting of *Castilloa* trees was done in 1902. There are reports that the Carranza Government had seized the property of the company for unpaid taxes amounting to \$35, and that the company had lost its license to do business in California through failure to pay the corporation tax, and also, that the stockholders had been notified that owing to the political situation in Mexico, it would be better to lose the property and wind up its affairs. The shareholders, many of whom have bought shares on the monthly payment plan, have applied to the courts to prevent what they consider a plot to wreck the company.

CALLED FOR ASSESSMENT

La Zacualpa-Hidalgo Rubber Co. has recently called an assessment of 12½ cents per share. As this stock has been inactive for some time, and had been offered at about 30 cents a share, the assessment was a heavy one. The assessment was made to reimburse those stockholders who had advanced about \$56,000 to carry on the affairs of the company, and to continue to meet expenses.

This corporation, although not the oldest, is, perhaps, the largest rubber planting company in Mexico. It comprises 1,897 acres situated in the Department of Soconusco, in the State of Chiapas. A large portion of the tract is planted with *Castilloa* trees. Of the authorized capital of 800,000 shares, there were outstanding at the end of its fiscal year, February 29, 1916, 619,-

from 47 to 76 cents a pound, the net receipts being \$39,770.84 and on March 1 there were 72,000 pounds in the hands of its sales agents. The annual report showed receipts \$59,280.90 and disbursements \$45,857.75. Presumably, the balance and the \$56,000 mentioned above as advanced by some of the stockholders, has been absorbed by expenses since March 1.

"GRINGOS" OBLIGED TO GET OUT

The following letter shows the discouraging position of some Americans connected with the rubber planting industry in Mexico. It reads:

TO THE EDITOR OF THE INDIA RUBBER WORLD:

Dear Sir—You will notice from this, that I am still making an effort to strive through the long-winded Mexican turmoil, but it looks very much as if all "Gringos" will have to get out, as we have now received a final message from the State Department, which is very urgent and to the point. I was in hopes of staying on, but from the rather serious conditions that now exist, I doubt very much as to the wisdom of it and, it is upon this account principally that I am writing to ask you about Central or South America. Do you know by any chance of an opening in my line down that way. I thought first of going into Guatemala temporarily, to await developments, with the idea in view of being near at hand, as I still have good interests here. What do you advise? Yours very cordially,

PIONEER.

OFFERS PRIZE FOR TAPPING PROCESS.

Another letter gives some insight into other difficulties which Mexican planters must face. This letter reads as follows:

TO THE EDITOR OF THE INDIA RUBBER WORLD:

Dear Sir—We have a property in Mexico of 1,200 acres of *Castilloa* rubber trees which are in excellent condition, except that for the last four years we have had to practically abandon them, and the tropical jungle has no doubt enveloped them. More than half of these trees were planted previous to 1909, beginning with 1904. In 1909 we had a fire in which probably three-fourths of our trees were burned. These afterwards grew up again from the stump, so that most of our property really dates from about 1909, 1910 and 1911.

You understand the difficulty that has been experienced in getting a successful method of tapping the *Castilloa* tree. Experiments that we have made and that we have known of, lead us to believe that there is an ample supply of latex in these trees to yield a handsome profit if a proper method of tapping can be devised. What we would like to do is to create an interest in investigation and experimentation along this line. If the Mexican Government were up-to-date it should be the party to foster investigation and to offer incentives for this work, but that is out of the question. We fortunately have ample funds and while I have not consulted with the other officers of our company personally, I would favor offering a reward of a sufficient amount to induce people who are in position to do it, to work and experiment along the lines of inventing or discovering a tapping system. If other people who have similar interests are in position to do it, it would only be fair that the burden of this be divided. However, I think there are few rubber planters, or former rubber planters in Mexico, who have much in the way of rubber trees, let alone much money, to do anything with. If a number of concerns could join together they could make the reward larger and thus offer greater inducements to effort.

Do you think that an offer of a reward of \$500 or \$1,000 would stimulate effort in this direction, and would you be will-



Castilloa TREES ON LA ZACUALPA PLANTATION.

597⅓ shares of stock at a par value of \$3,097,988. The estate is equipped with modern improved machinery for the preparation of the product for the market, and last year produced 143,700 pounds of rubber. About one-half of this was sold during the year at

ing to take hold of the project and give it publicity? Could you put us in touch with others who are interested and who might be willing to join in the project?

Yours truly, PLANTER.

THE RUBBER TRADE IN BRITISH GUIANA.

By Our Regular Correspondent.

THE steady progress that is being made by the Consolidated Rubber and Balata Estates, Limited, as revealed by the report and the chairman's speech at the annual meeting held on June 27 in London, should prove a source of gratification to all who take wide views of the industrial situation in the Guianas. The operations of this company play no small part in British Guiana's commercial fortunes, and its progress is anxiously watched by a larger circle than a mere collection of investors looking for dividends, since the industry provides lucrative employment for a large portion of the laboring classes, and consequently makes a useful contribution to the trade of this colony. Therefore, the information contained in this report that the company is each year acquiring a greater measure of stability is exceedingly refreshing, when it is to be remembered the many vicissitudes through which it has passed. For seven years has it been in existence and not yet has the industry been sufficiently prosperous to return a dividend to the ordinary shareholders, and there are still a certain amount of arrears to pay off upon the preferred shares. But the company has passed through the worst of its difficulties, and is now entering upon the profit-earning stage, and its future, unless some very unfortunate calamity occurs, will be roseate.

In 1913 the profits amounted to \$1,310 only; in 1914 to \$59,890, and in 1915 to \$77,945. These profits are still only sufficient, after applying \$10,000 to reduction of preliminary expenses account and carrying forward \$6,085, to pay a dividend of 5¼ per cent on the 7 per cent preferred shares. But the improvement in the company's position that has manifested itself recently is of such a consistently upward nature as to leave very little room for doubt that a prosperous future awaits the enterprise. Much that has been achieved is due to the cautious and skilful management of the local attorney, A. F. White, who, with so many obstacles in the way, has landed the concern on a bed-rock footing.

The mill-stone of the balata companies which participated in the boom of 1910-11—the cost of prospections—has practically disappeared from the neck of the Consolidated, the cost of this item being only \$3,375 in 1915, against \$22,770 in 1914, and \$41,390 in 1913. This, as the chairman pointed out, is exceedingly satisfactory. Still more encouraging is it to read that the prospective collections for this year are even better than they were in 1915, in which year they were quite good, and would have brought handsome returns to the company, had the market been in a more settled condition. The chairman stated that "already an early spring crop of quite respectable dimensions has been gathered; in fact, a larger spring crop than we have ever succeeded in securing before," and that all expeditions for the summer collections had been sent out. "The prospects for this year are satisfactory, and, given favorable weather—a factor of great importance—we shall hope to obtain greater results which will show continued progress for the company."

Thanks to the Crown Lands Regulations at British Guiana, the balata industry is not one that is likely to be killed out by overworking it, for the health and life of the trees are safeguarded and insisted upon by the government, and providing the regulations are observed, the industry will be maintained for years.

The most important part of the chairman's speech, however, is that part which deals especially with the rubber industry. Mr. Tayler spoke in figures that will come as a surprise to many, especially to those who are accustomed to think of rubber grow-

ing in these parts in very humble terms. On the Aruka plantation 317 acres are under cultivation, and 20,000 trees are planted. The estate comprises 1,000 acres and it is being cleared and planted year by year with *Hevea Brasiliensis*. On the Koriabo estate, 106 acres are planted, and on the Aliki and Wycarabee estates 252 acres are planted. On the whole of the company's rubber properties 60,000 trees are planted, of which about 20,000 are tappable this year, 30,000 in 1917 and 47,000 in 1918. The production in 1915 was only 4,500 pounds, but most of the preliminary work has now been undertaken, and the colony's rubber exports should increase rapidly.

In a quiet way the Consolidated company has laid the foundations for a promising rubber industry for British Guiana, and when in the years to come, rubber estates are dotted all over British and Dutch Guiana, the sterling work of this pioneer company should not be forgotten.

I am tired of preaching the possibilities of rubber in these parts, and consequently am the more glad to welcome the practical demonstration that is now being given by the Consolidated. This company is pursuing a sound financial policy, paying the arrears of interest, and retaining as much capital as possible in its possession to carry on the large schemes of development which are just beginning to bear fruit. As the chairman said, the directors, seeing the possibilities of British Guiana, are looking far ahead, and there can be no doubt that they are laying part of the foundations of the future prosperity of the colony. For that reason alone, their progress should be watched by every interested party with the keenest of sympathetic interest.

ADDITIONAL SURTAX ON IMPORTS INTO PARAGUAY.

A law enacted February 17, 1916, provides that all articles imported into Paraguay shall be subject to an additional surtax of 1½ per cent ad valorem (based on official valuations prescribed by the customs tariff), while on all exports an additional surtax of 1 per cent ad valorem is to be imposed.

REGISTRATION OF TRADE-MARKS IN LATIN-AMERICAN COUNTRIES.

The importance of early registration of trade-marks used in commerce with Latin-American countries cannot be overlooked by American rubber manufacturers.

In 1915 the Bureau of Foreign and Domestic Commerce, Department of Commerce, Washington, D. C., issued a report describing briefly the formalities of registration, and also indicating the offices to which applications should be directed, the duration of protection, and the principal official fees. A revised edition of this publication, which is entitled "Tariff Series No. 31, Registration of Trade-Marks in Latin-America," with corrections to date, has been issued, and copies can be obtained upon application to the Bureau of Foreign and Domestic Commerce, Washington, D. C., or its district offices. Information regarding countries that are not covered by this publication may also be obtained by addressing the Washington office of the Bureau.

SCANTY YIELD FROM WEST INDIAN SAPODILLA.

Attention has been drawn to the fact that the Sapodilla tree (*Achras Sapota*) grown in the West Indies, although supposed to be of the same species as that grown in Central America, does not yield as freely as the latter. A thorough tapping of a 20-year-old tree 39 inches in girth at three feet from the ground yielded 3½ fluid ounces of latex, which gave 1¾ ounces of chicle. This gum was submitted to one of the largest chewing gum manufacturers in America, who stated that it could be marketed to advantage here, but the low yield of the gum as compared with that secured from Mexico and Central America renders it doubtful whether its collection would be profitable. The chief value of the tree in the West Indies lies in its excellent fruit, which, it is said, might be still further improved by careful selection experiments. [Report of the Agricultural Department, Dominica, British West Indies, 1914-1915.]

Recent Patents Relating to Rubber.

THE UNITED STATES.

ISSUED AUGUST 15, 1916.

- N**O. 1,194,393. Water closet seat comprising a core of laminated wood and a veneer of hard vulcanized rubber. M. L. Adler, New York City, assignor to the Brunswick-Balke-Collender Co., Chicago, Ill.
- 1,194,408. Packing comprising four plies of a single strip of fabric impregnated with rubber, and an intermediate endless wire strand. R. B. Meany, Weehawken, N. J., assignor to Peerless Rubber Manufacturing Co., New York City.
- 1,194,428. Reinforced pad for shoes. L. S. Samuel, Newark, N. J.
- 1,194,651. Rubber tired vehicle wheel. J. M. McPheters, Palo Alto, Calif.
- 1,194,681. Tire armor. A. Szkoknya, Chicago, Ill.
- 1,194,704. Wearing surface for conveyor belt comprising layers of fabric united by rubber and vulcanized. W. F. Bowers, San Francisco, Calif.
- 1,194,732. Rubber and canvas sole for bathing and outing shoes. W. Greilich, Brooklyn, N. Y.
- 1,194,789. Sectional cushion tire. I. Spyker, Amsterdam, Netherlands.
- 1,194,790. Resilient wheel. I. Spyker, Amsterdam, Netherlands.
- 1,194,793. Hose connection. H. V. Styers, Warwick, N. Y.
- 1,194,797. Tire for vehicle wheels. F. S. Weise, Baltimore, Md.
- 1,194,854. Demountable rim. W. T. McLean, assignor of one-half to G. W. Lyndon, both of Chicago, Ill.
- 1,195,023. Inflatable figure in marionette baseball performance toy. T. H. Jackson, Scranton, Pa.
- 1,195,036. Elastic fabric. C. A. Lapworth, West Bridgewater, assignor to The Lapworth Webbing Co., Brockton—both in Massachusetts.
- 1,195,117. Device for removing wrinkles. M. Spellerberg, Berlin-Friedenau, Germany.
- 1,195,125. Fountain pen. E. Winne, New York City.

ISSUED AUGUST 22, 1916

- 1,195,327. Inside heel cushion of sponge rubber. J. W. Arrowsmith, Morristown, N. J.
- 1,195,354. Garter or hose supporter. R. K. Guinzburg, assignor to I. B. Kleinert Rubber Co.—both of New York City.
- 1,195,365. Life preserving garment with inflatable portions. J. Krem, Philadelphia, Pa.
- 1,195,512. Tire for wheels and means for retaining the same. E. H. Schwarz, New York City.
- 1,195,556. Resilient tire. T. L. Carbone, Charlottenburg, Germany.
- 1,195,580. Hose coupling. F. Hachmann, assignor of one-fourth to F. C. Schoenthaler—both of St. Louis, Mo.; one-fourth to J. Merz, and one-fourth to G. S. Haskell, Chicago, Ill.
- 1,195,621. Catamenial napkin. E. Sprague, Minneapolis, Minn.
- 1,195,640. Antiskidding device for vehicle wheels. S. Baruch, New York City.
- 1,195,709. Fountain pen. L. J. Most, New York City.
- 1,195,735. Vehicle bumper comprising a block of rubber. F. T. Roberts, Trenton, N. J., assignor to The Paramount Rubber Co., Cleveland, Ohio.
- 1,195,913. Tire armor. E. B. Curry, Payson, Ill.
- 1,195,931. Surgical appliance comprising pneumatic knee pads. J. L. Sowell, Jasper, Ala.
- 1,195,939. Valve attachment for pneumatic tires and the like. C. E. Baker, Carmarthen, Wales.

ISSUED AUGUST 29, 1916.

- 1,196,069. Vehicle tire. L. F. N. Baldwin, Cranston, R. I.
- 1,196,250. Aseptic appliance comprising a sheet of comparatively thick rubber. A. O. Kuhn, San Francisco, Calif.
- 1,196,539. Air-purifier comprising rubber tubes. E. I. Goldberg, New York City.
- 1,196,545. Air bulb in handle for canes, umbrellas, etc. S. E. Holdzkorn, Longport, N. J.
- 1,196,604. Vehicle wheel rim. C. H. Snyder and E. Stallter, Rockford, Ohio.
- 1,196,608. Rubber heel. J. F. Standish, Winthrop, Mass., assignor to United Shoe Machinery Co., Paterson, N. J.
- 1,196,649. Rubber figure toy. L. A. Bockstahler, Cleveland, Ohio.
- 1,196,678. Garment supporter. L. A. Griswold, Dayton, Ohio.
- 1,196,680. Hose coupling. H. Handoll, London, England.

ISSUED SEPTEMBER 5, 1916.

- 1,196,800. Elastic strip in skirt band. B. F. Miller, Philadelphia, Pa.
- 1,196,817. Tube for storage battery plates having its inner part of rubber material containing finely divided lamp black and its outer part of relatively pure hard rubber. E. W. Smith, Philadelphia, Pa.
- 1,197,011. Combined nursing bottle and teat. F. Cilinc, Pueblo, Colo.
- 1,197,115. Submarine life-preserver. G. E. Fell and G. A. Fell, Buffalo, N. Y.; said G. E. Fell assignor to said G. A. Fell.
- 1,197,118. Solid tire with an inner annular opening. B. A. Godek and I. Benjamin, Paris, France.
- 1,197,236. Rain-proof garment. M. Schnur, New York City.
- 1,197,266. Syringe. J. E. Cox, assignor of one-half to J. F. Brown—both of Chicago, Ill.
- 1,197,312. Storage-battery separator. H. Weida, Highland Park, assignor to The India Rubber Co., New Brunswick—both in New Jersey.
- 1,197,368. Hose-supporter with rubber button. C. J. Hausen, New York City.
- 1,197,432. Cushion tire tube. R. J. Bartholomew, Lorton, Mo.
- 1,197,454. Diving apparatus. W. Deuter, Wells, Minn.
- 1,197,493. Armored tire. G. L. Hurd, Tenaflly, N. J.

ISSUED SEPTEMBER 12, 1916

- 1,197,587. Tire comprising a body of rubber and tread layer of fabricated fibrous material. H. R. Auld, Boston, assignor to G. E. Carr, West Roxbury—both in Massachusetts.
- 1,197,670. Life saving suit. F. Schlachter, Decatur, Ill.
- 1,197,719. Demountable wheel rim. H. E. Doebler, Cannon Falls, Minn.
- 1,197,768. Locking device for demountable rims. R. J. Schone, St. Charles, Mo.
- 1,197,805. Compression inner tube for a double tube tire. N. C. Doss, Rome, Ga.
- 1,197,814. Vehicle-wheel rim. F. A. Frommann, assignor to O. Frommann, both of Chicago, Ill.
- 1,197,823. Life saving suit. B. E. Hervey, Wallace, Idaho.
- 1,197,863. Gasket of rubber compound for hose couplings. E. A. Schreiber, assignor to Chicago Car Heating Co.—both of Chicago, Ill.
- 1,197,911. Rubber sole shoe welt of hard and soft rubber. Le B. C. Colt, assignor to National India Rubber Co.—both of Bristol, R. I.
- 1,197,913. Rubber sole shoe welt of hard and soft rubber. Le B. C. Colt, assignor to National India Rubber Co.—both of Bristol, R. I.
- 1,197,987. Pneumatic tire casing with inner supporting frame. A. Winick, Jacksonville, Fla.
- 1,198,071. Vehicle-wheel with interposed pneumatic tube and a tire. M. C. Sharpnack, assignor of one-half to B. F. Goodwin—both of Prescott, Ariz.
- 1,198,104. Locking means for demountable wheel-rims. J. P. Burger, Cleveland, Ohio.
- 1,198,176. Massage device. L. J. Widness, New York City.
- 1,198,240. Tire having a tread and base of elastic rubber. A. S. Krotz, Janesville, Wis.
- 1,198,242. Demountable rim. U. S. Landis, Oakershield, Calif.
- 1,198,287. Attachment for pneumatic tire valves. C. G. Spencer, East Orange, N. J.
- 1,198,317. Demountable rim for vehicle wheels. F. P. Blubaugh, Fort Scott, Kan.
- 1,198,366. Golf and other playing ball. P. A. Martin and J. Stanley, Birmingham, Eng.
- 1,198,384. Rubber bulb. T. W. Miller, assignor to The Faultless Rubber Co.—both of Ashland, Ohio.

THE DOMINION OF CANADA.

ISSUED MAY 31, 1916

- *169,199. Sleeping garment having elastic section and straps. F. J. Blenis, Valhalla, N. Y.
- *169,360. Rubber sole protecting device to be adjusted to the shoe by means of clamps and straps. J. C. Hocker, Barnard, Mo.
- *169,494. Inflatable horse collar. J. Baarson and A. Thorson, Odin, Minn.
- *169,536. Anti-skid device. W. Grus, Jr., Chicago, Ill.
- *169,595. Rectal syringe. C. A. Tyrrell, New York City.

*Denotes patents for American inventions.

- *169,612. Cushion for...
 *169,647. Automobile tire...
 Sellberg, Winslow, Ariz.
 *169,669. Life saving...
 *169,581. High...
 *169,675. Resilient wheel comprising a solid rubber tire. A. Freund, St. Louis, Mo.
 *169,705. Life preserver...
 J. E. Lomas, Smuggler, Colo.
 *169,719. Massage glove...
 *169,732. Automobile...
 *169,733. Weather strip...
 *169,765. Hose support...
 *169,832. Cooler for pneumatic tires. P. J. Cuddihy, Rutherford, N. J.
 *169,847. Automobile tire. T. H. Griffiths, Toronto, Ontario, Canada.
 *169,900. Rubber sheet...
 *169,766. Button clasp...
 *169,943. Balata and leather belting...
 *169,999. Pneumatic tire cover...
 *170,018. Hose armor...
 *170,020. Rubber footwear with reinforced heel...
 *170,029. Rubber glove...
 *170,058. Automobile floor mat...
 *170,070. Lining for brake shoes...
 *170,081. Pneumatic tire alarm...
 *170,102. Artificial teat...
 *170,152. Composite waterproof material for shoe soles...
 *170,160. Vehicle tire comprising a pneumatic tube and metal cover...
 *170,266. Automobile tire comprising a rim, casing and tread...
 *170,290. Plug for rubber heels...
 *170,297. Fountain syringe...
 *170,469. Artificial foot...
 *170,480. Rubber heel...

THE UNITED KINGDOM. PATENT SPECIFICATIONS PUBLISHED.

In order to give the public the advantage of having abridgments of specifications up to date while retaining their numerical sequence, applications for patents made subsequent to 1915 are given new numbers when their complete specifications are accepted, or become open to public inspection before acceptance. The new numbers start with No. 100,001 (without any indication of date), and supersede the original application numbers in all proceedings after acceptance of the complete specifications.

[ABSTRACTED IN THE ILLUSTRATED OFFICIAL JOURNAL, AUGUST 9, 1916.]

- 5,665 (1915). Manner of joining wire rings vulcanized in the edge of pneumatic tires. G. E. Birmingham and D. Moseley & Sons, Chapelfield Works, Chapelfield Lane, Ardwick, Manchester.
 *5,790 (1915). Fountain pen. W. I. Ferris, 525 Lawrence avenue, Westfield, and E. F. Britten, 21 Van Reipen avenue, Jersey City—both in New Jersey.
 5,858 (1915). Wire embedded rubber sole for attachment to a shoe by means of hooks and straps. R. M. Withycombe, "Wyoming," Macquarie street, Sydney, New South Wales, Australia.
 5,872 (1915). Rubber strips in saddle girths and surcingles. A. C. Gull, Serpentine, and C. Watson, Barrack street, Perth—both in Western Australia.
 5,900 (1915). Sealing device for glass containers comprising rubber gasket...
 5,922 (1915). Inflatable...
 5,985 (1915). Waterproof overall stocking...
 100,642. Segmental tire...
 6,000 (1915). Sock suspenders...
 6,255 (1915). Wheel tire with hard rubber tread...
 *6,281 (1915). Puncture proof band to be secured to the inner side of a tire...

* Denotes patents for American inventions.

- 6,337 (1915). Rubber handles for tennis rackets, etc. B. C. Bart, 319 Kingston Road, Merton Park, Wembley, Surrey.
 100,734. Cover for preventing bursting of a diving dress when inflated...
 6,390 (1915). Window fly-screen comprising a strip of rubber...
 6,465 (1915). Sleeping-bag comprising an outer waterproof casing...
 6,487 (1915). Fountain pen having a collapsible ink sac...
 6,500 (1915). Toy submarine comprising two elastic bulbs...
 6,570 (1915). Fountain pens...
 6,583 (1915). Solid tire with rubber cushions...
 6,585 (1915). Helmet with rubber securing bands...
 100,755. Pneumatic arm-pit supports for the heads of crutches...
 100,759. Tread bands for wheel tires...
 100,764. Rubber ends for wire garment stiffeners...
 100,786. Segmental cover for pneumatic tires...
 6,866 (1915). Wristlets of elastic and elastic webbing...
 *6,987 (1915). Armored tread for pneumatic tires...
 7,085 (1915). Rubber lining for cavities in closet seats...
 7,148 (1915). Rubber ring for washing plunger...
 7,163 (1915). Vulcanite cigarette holder...
 *100,811. Spring wheel with rubber ring and rope tread...
 *100,838. Metallic inner tube...

NEW ZEALAND.

- 36,411. Pneumatic tire...
 37,436. Rubber heel and sole...
 37,583. Pneumatic tire...

ISSUED JULY 6, 1916

THE FRENCH REPUBLIC.

PATENTS ISSUED (WITH DATES OF APPLICATION).

- 479,881 (March 2, 1915). Armored tire without air tube, for vehicle wheels...
 479,891 (September 29). Elastic wheel for vehicles...
 479,895 (September 30). Improvements in buffer springs, tractor springs and others, made with rubber...
 479,897 (September 30). Rubber heel...
 479,906 (October 2). Pneumatic tire...
 479,969 (October 8). Air chamber for pneumatic tires...
 479,981 (October 11). Wheel with pneumatic tire for vehicle wheels...
 479,988 (October 13). Improvements in the manufacture of pneumatic tires...

TRADE-MARKS.

THE UNITED STATES.

- 64,341. The word EFFICIENCY—hose, tubing, belting, gaskets, valves, packing...
 79,119. The word NARCO—waterproofing composition for inner tubes, patches, and rubber repair stock generally...
 96,128. An illustration of the words SLICK TIRE—tire patches...
 96,291. The words RELIANCE DE L'EAU—water bottles, fountain syringes, etc...
 96,484. The letter S with the letters TERILI within—syringes, etc...
 96,772. The word HALLMARK—fountain pens and parts thereof...
 71,150. Illustration of a high boot, the narrow upper band colored red—rubber boots, rubber shoes, rubber shoe-packs, and rubber shoes with leather tops...
 96,213. The word PEARL—golf and other playing balls...
 96,403. An illustration within a circle, of a boy protecting himself in a shower with rubber matting—rubber matting...

- 89,981. The representation of a section of packing on which is arranged the word CHANNEL—rubber and fiber packings for the piston rods of engines and pumps. R. L. Henry, New York City.
- 96,534. The word STAG—tire,obile tires, inner tubes, etc. Times Square Automobile Co., New York City.
- 96,559. The word TRAFFIC—tire treads. The Federal Rubber Co., Cudahy, Wis.
- 96,821. The word INTERNATIONAL—belting, made partly of rubber and partly of cotton. The Manhattan Rubber Manufacturing Co., New York City.
- 96,822. The word DEFADNANT—belting, hose and machinery packing made partly of rubber and partly of cotton. The Manhattan Rubber Manufacturing Co., New York City.
- 96,823. The word KORTLANDT—belting, hose and machinery packing made partly of rubber and partly of cotton. The Manhattan Rubber Manufacturing Co., New York City.
- 96,824. The word CENTRA—belting and hose made partly of rubber and partly of cotton. The Manhattan Rubber Manufacturing Co., New York City.
- 96,825. The word PROSPECTOR—belting made partly of rubber and partly of cotton. The Manhattan Rubber Manufacturing Co., New York City.
- 96,827. The word YEOMAN—belting made partly of rubber and partly of cotton. The Manhattan Rubber Manufacturing Co., New York City.
- 96,835. The word VIKING—hose and machinery packing made partly of rubber and partly of cotton. The Manhattan Rubber Manufacturing Co., New York City.
- 96,838. The words WHITE JACKET—hose made partly of rubber and partly of cotton. The Manhattan Rubber Manufacturing Co., New York City.
- 96,839. The word MOHICAN—machinery packing made partly of rubber and partly of cotton. The Manhattan Rubber Manufacturing Co., New York City.
- 96,840. The words "GOLDEN FLEECE"—machinery packing made of flax. The Manhattan Rubber Manufacturing Co., New York City.
- 96,841. The word CARDINAL—brakelining made partly of asbestos and partly of rubber, and machinery packing made of composite rubber. The Manhattan Rubber Manufacturing Co., New York City.
- 96,842. The word RAVEN—composite rubber packing. The Manhattan Rubber Manufacturing Co., New York City.
- 96,843. The word HEADLIGHT—machinery packing made partly of flax and partly of rubber. The Manhattan Rubber Manufacturing Co., New York City.
- 64,341. The word EFFICIENCY—mechanical rubber goods. Imperial Rubber Co., New York City.
- 91,088. The word NURSING—nursing-nipples. The Vant Woud Rubber Co., Brooklyn, N. Y.
- 96,693. The word PEN-ET-ZIP—toy balloons. The Miller Rubber Co., Akron, Ohio.
- 96,803. An illustration of a shield with the monogram THE R. P. Co.—seamless fountain syringes and no seam water-bottles. The Rubber Products Co., Barberton, Ohio.
- 90,288. The words "GRAFINITE" TUBE—inner tubes or air tubes for vehicle tires.
- 95,043. The word KELMAN—asbestos, metal, rubber and cotton machinery packing, belting and hose. R. Kelly, New York City.
- 95,675. The word WONDERFUL—abdominal belts made of rubber, cloth, and combinations of rubber and cloth. Kops Bros., New York City.
- 95,942. The word NAUGASOLE—boots and shoes having rubber or composition rubber and fiber soles attached thereto by vulcanization. The Goodvear's Metallic Rubber Shoe Co., Naugatuck, Conn.
- 96,505. The word BRIGHTON—suspenders, belts and armbands. Pioneer Suspender Co., Philadelphia, Pa.

THE DOMINION OF CANADA.

- *21,723 The word PORCUPINE—tire treads. The Portage Rubber Co., Barberton, Ohio.
- 21,746. The words CANADIAN and the representation of a partridge—soft rubber goods, such as vehicle tires, tire tubes, water bottles, tobacco pouches, etc. The F. E. Partridge Rubber Co., Montreal, Quebec, Canada.
- *21,780 The word "SUNSHINE"—rubber goods, fabrics and suspensions of garments. C. Kenyon Co., Brooklyn, N. Y.

THE UNITED KINGDOM

- 371,437 The words JOHN BULL—rubber cases. St. Mungo Manufacturing Co., Glasgow.
- 371,648. The word KURSPIN—golf balls, golf clubs and golf bags. Wood-Milne, Limited, Ribbles Banks Mills, Preston, Lancs.
- 371,658. Two concentric circles traversed by an arrow and bearing the words "TRADE-MARK" and "WOOD-MILNE"—pumps and tire inflators; artificial leather for soles and heels of boots and shoes; tire inner tubes; tips, pads for boots and shoes; all made of rubber. Wood-Milne, Limited, Ribbles Banks Mills, Preston, Lancs.
- 372,101. The word PERTEX—vulcanized rubber sheets, springs, washers, valves, buffers and similar goods. Anderson, Anderson & Anderson, Limited, 35 Saint Paul's Churchyard, London, E. C.
- 372,102. The word REXRUB—goods manufactured of rubber and gutta percha. Anderson, Anderson & Anderson, Limited, 35 Saint Paul's Churchyard, London, E. C.
- 372,103. The word VULTEX—vulcanized rubber sheets, springs, washers, valves, buffers and similar goods. Anderson, Anderson & Anderson, Limited, 35 Saint Paul's Churchyard, London, E. C.
- 372,122. The word WIZARD—apparatus for vulcanizing tires. J. B. Auto-Specialties Co., Cheltenham, Surrey.

- 372,161. The word SOLAX—balata material to be employed in the manufacture of soles for boots and shoes. Norman Isherwood & Co., Limited, Bolton, Lancs.
- 372,193. The word REGENT—balata goods, not including tires and belting. Cohen & Wilks, Cheetham, Manchester.
- 372,727. The word CLINCHER—all rubber goods included in class 9. The North British Rubber Co., Limited, Castle Mills, Edinburgh.
- 372,857. The word BALCOT—balata belting. The Manchester Balata Belting Co., Limited, Liverpool.

THE FRENCH REPUBLIC.

- 34 A cannon with the figure 75—rubber tobacco pouches. Eugène Ruffe, Boumeles Dames.
- 16,875. A banner placed horizontally and made up of the several flags of the Entente Allies. Madam Rose Ducassou, Marseille.
- 16,896. The figures 14-15—rubber goods. Marie Louise Faret, Marseille.
- 16,897. The figures 1914-1915. Same.
- 16,898. The figure 11. Same.
- 16,899. The figure 1914. Same.
- 16,921. The words Y A BOY—rubber goods. Ferdinand Guinand, Marseille.
- 16,922. The word PACIFIC—Same.
- 16,923. The word MAGARD—Same.
- 16,924. The word ATLANTIC—Same.
- 16,925. The words SAINT JAMES—Same.
- 17,120. The word RIVIERA—Same.
- 17,121. The word ELISE—Same.
- 17,122. The word VICTOIRE—Same.
- 17,123. The word TOURISTE—Same.
- 17,124. The word CANNIBIERE—Same.
- 17,125. The word JOLLETTE—Same.
- 17,126. The word TOMMY—Same.
- 17,127. The word STANDARD—Same.
- 17,128. The word BUFFALO—Same.
- 17,129. The word TIPPERARY—Same.
- 17,130. The word STAR—Same.
- 17,131. The word SIMPLEX—Same.
- 17,132. The word DAISY—Same.
- 17,134. The word DERBY—Same.
- 23,794. The word DAINTY—dress shields containing rubber. Kirby, Beard & Co., Birmingham, England.
- 3,817. The word BELSOL—fabrics, elastic bandages, etc., made part in rubber or gutta percha, part in textiles or fibers, tires, garments, footwear, packings, etc. Ernest Hilder Godbold, London, England.
- *23,975. The name CHAIN TRAP—enclosed by a chain—rubber footwear. The United States Rubber Co., New York City.
- 159,702. The words DES POILUS—rubber goods. Roger Mesnil, Paris.
- 159,706. The words WATER-C. TH.-PROOF—paste for proofing fabrics and paper. Camille Therm, Paris.
- 159,865. The name LA JOFFRETTE—rubber tobacco pouches. Joseph Buret, Paris.
- 159,982. The name LE PARALLO—fabric-proofing powder. R. Globa Milhailenko, Paris.
- 159,995. The words CROIX DE GUERRE—rubber goods. Louis Moreau, Paris.
- 160,096. The words LA VALEUR MILITAIRE—Same.
- 160,195. The name LE TUYAU—collapsible rubber funnel for pouring gasoline into tanks of motor vehicles or aeroplanes. Société Lorraine des Anciens Etablissements Dietrich et Cie., de Lunéville, Paris.
- 160,361. The words THE RUBBER WARS LTD.—rubber goods. Veuve Kasser, Paris.
- 160,479. A revolvable rubber heel with the words PAPILLON NOIR ST. PÉRIEUR—rubber heels. Alfred Mulard, Paris.
- 161,560. A ball with a surmounting a comet—rubber goods. Société des Etablissements Bognier et Burnet, Paris.
- 161,564. A revolvable rubber heel bearing the words WALK FAIR SPECIAL—rubber heels. Marcel Duval, Paris.
- 161,566. A revolvable rubber heel bearing the words WALK FAIR FLESH—rubber heels. Same.

DESIGNS.

THE UNITED STATES.

- 49,534. The U. S. FLAG—Washington, D. C.
- 49,535. Vehicle tire. A. H. Boyd, Aspinwall, Pa., assignor to The Porter Rubber Co., Salem, Ohio.
- 49,541. Rubber vehicle tire. S. G. Lewis, Greensburg, assignor to Pennsylvania Rubber Co., Jeannette—both in Pennsylvania.
- 49,550. Mat. J. Scherner, Milwaukee, assignor to Federal Rubber Manufacturing Co., Cudahy—both in Wisconsin.
- 49,556. Tire tread. R. G. Wooten, Toronto, Ontario, Canada.
- 49,573. Shoe. Le Baron C. Galt, assignor to National India Rubber Co., both of Bristol, R. I.
- 49,590. Tire tread. W. S. Wolff, Akron, Ohio.
- 49,607. Tire tread. H. A. Githen, Milwaukee, assignor to The Federal Rubber Co., Cudahy—both in Wisconsin.
- 49,608. Tire tread. C. C. Gates, assignor to The International Rubber Co., both of Denver, Colo.

PRINTS.

- 1440 "U. S. RUBBER SYSTEM" for Wearing Apparel and Rubber Products. United States Rubber Co., New Brunswick, N. J.

*Denotes Trade Mark Owned by American Companies.

Review of the Crude Rubber Market.

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NEW YORK

THE demand for crude rubber during September has not been large enough in volume to affect the steady market conditions that have generally prevailed. The arrivals have been heavy this month in comparison to August receipts, which were small, due to the delays in transit and congested shipping. Guaranteed deliveries from London are placed at 40 days, and from the Far East three or four months are required. It would seem that under these prevailing conditions a large and immediate demand could not be supplied. There has been a fair demand for plantations, and the tone of the market is steady, with fluctuating prices, First latex showing a gain of about 3 cents during the month. The theory that the large buyers are in control is supported by advanced quotations when orders are placed in London. Upriver fine has been the feature of the month. The shortage is evident, despite the heavy arrivals. Spot prices have fluctuated from 70 cents to as high as 75 cents within the month, and on September 29 the figure was 73 cents in an easier market. Futures were quoted: October-November, 71 cents; November-December, 70 cents.

According to official figures recently issued by the Department of Commerce, 119,542 tons of crude rubber were imported into the United States during the fiscal year ended June 30, 1916, as compared with 76,816 tons in 1915 and 58,926 tons in 1914.

LONDON.

The steady increase of stocks and the approaching period of heaviest arrivals would forecast easier conditions in London. The cost to holders may necessitate their unloading, which undoubtedly would be followed by weak market conditions. The cause of these accumulations is said to be the refusal of producers to sell forward. Price advances have not been followed up, as buyers are satisfied to take chances with a large crop in view. There is some speculation as to accumulated supplies available from East Africa, which has recently become a British possession.

On September 5 the market was firm and quiet, Standard crêpe being quoted at 53 cents and smoked sheet 52½ cents. Steady and quiet conditions prevailed during the month, and on September 25 Standard crêpe was 57 cents and Smoked sheet 56½ cents.

PARA AND MANAOS.

The trade has been elated over the upward movement of Upriver fine that featured the September market. Later in the month prices eased off, but the scarcity of stocks, particularly Upriver fine, was still apparent. The actual cause of this movement is unknown; however, there are certain facts which undoubtedly have been generally effective. For instance, the rivers were abnormally low and supplies consequently delayed. Russia has been in the market for considerable supply. The production of Caucho has increased and Upriver fine has decreased during the year, as is indicated by the following table:

PARA ARRIVALS FOR AUGUST, 1915-16.

	August, 1915.	August, 1916.
Islands, fine	412	404
Upriver, fine	1,313	1,176
Caucho	315	420
Totals	2,440	2,300

SINGAPORE.

At the auction held September 1, 8, 15 and 24 about 1,500 tons were sold. First latex crêpe brought an average of 51 cents and Smoked sheet 51½ cents a pound.

NEW YORK QUOTATIONS

Following are the quotations at New York one year ago, one month ago, and September 29, the current date

PARA.	Oct. 1, 1915.	Sept. 1, 1916	Sept. 29, 1916
Upriver, fine, new	54½ @ 55	61 @	73 @
Upriver, fine, old	56 @ 57		
Islands, fine, new	50 @ 51	58 @	65 @
Islands, fine, old	52 @		
Upriver, coarse, new	41½ @ 42	41 @	43½ @
Upriver, coarse, old	43 @		
Islands, coarse, new	36 @ 37	28 @	30 @
Islands, coarse, old	38 @		
Caucho	47 @ 48	33 @	32 @
Caucho, half sheet	42 @	41 @	44 @
Caucho, half block	40 @	36 @	41 @
PLANTATIONS.			
First latex crêpe	Spot... 55 @ 60 Futures... 57 @	Spot... 56 @ Futures... 57 @	60 @ 60 @
Amber crêpe, light	Spot... 55 @ Futures... 55 @	Spot... 55 @ Futures... 55 @	57½ @ 57½ @
Brown crêpe, clean	Spot... 52 @ Futures... 51 @	Spot... 52 @ Futures... 51 @	54 @ 54 @
Smoked sheet, ribbed	Spot... 59½ @ Futures... 56½ @	Spot... 56½ @ Futures... 56½ @	59½ @ 59½ @
Fine sheets and biscuits	57 @ 57		
CENTRALS.			
Camero	35 @	35 @	42 @
Esmeraldas, strip	38½ @ 39	39 @	41½ @
Nicaragua, strip	38 @	38 @	41 @
Mexican plantations, sheet			46 @ 52
Mexican, sheet	30 @ 40		40 @
Mexican, slab			31 @
Manoaba, sheet	33 @ 36	42½ @ 43	42½ @
Mangabeira, sheet	32 @ 38	37½ @	37½ @
Guayule	26 @ 30	32 @ 33	32 @ 33
Bahia, sheet	51 @ 52	79 @	73½ @
Bahia, block	43 @	50 @	65 @
AFRICAN.			
Lopori, ball, prime	52 @ 53	52 @	50 @
Lopori, strip, prime		52 @	51 @
Upper Congo, ball, red	50 @ 51	51 @	51 @
Rio Nunez, Niggers	53 @ 53½	53 @	54 @
Conakry, Niggers	51 @ 52	52 @	52 @
Massai, red	51 @ 52	51 @	52½ @
Sonito, Niggers	44 @ 45	50 @ 51	50 @
Cameroon, ball, soft			
Cameroon, ball, hard			
Benguela, No. 2 Superior	31 @ 32	38 @	38 @
Benguela, No. 2		35 @	34½ @ 35
Aceto, flake	24 @ 25	25 @	28 @
EAST INDIAN.			
Assam	45 @ 47	38 @	38 @
Port Blair	53½ @ 7	6½ @	8½ @
Gutta Siak	11½ @ 12	17 @	13 @
Gutta red Nige		25 @	26½ @
Borneo III			
Gutta, Pichia, and Malacca	1.00 @ 2.10	1.50 @ 2.50	1.60 @

MARKET CABLE SERVICE FROM LONDON.

The following report has been cabled from Aldens' Successors, Limited, London:

Date	Standard Crêpe	Smoked Sheet	Market
September 8	53	52½	Steady.
September 15	53½	53	Steady.
September 18	57	57	Quiet.
September 25	57	56½	Quiet and steady.

MARKET CABLE SERVICE FROM SINGAPORE.

The following reports of the weekly auction at Singapore have been cabled by The Waterhouse Co., Limited:

Date	Crêpe Price per lb.	Smoked Sheet Price per lb.	Pounds Sold.	Market
Sept. 1, cents	49.7	50.1	855,680	Holders less anxious to sell.
Sept. 8	50.5	51.0	795,200	Closed strong.
Sept. 15	51.0	51.0	826,560	Good demand for all descriptions.
Sept. 22	53.7	54.2	795,200	Active at the advance

COMPARATIVE NEW YORK PRICES FOR SEPTEMBER

In regard to the financial situation, Albert B. Beers (broker in crude rubber and commercial paper, No. 68 William street, New York) advises as follows:

"A good demand for Commercial Paper in the rubber line has continued this month, the best names going at 4½@4¾ per cent., and those not so well known 5@5½ per cent., and out of town banks buying."

	1916.*	1915.	1914.
Upriver, fine	\$0.69@0.74	\$0.55@0.57	\$0.64@0.78
Upriver, coars	.41@.44	.41@.43	.43@.55
Islands, fine	.58@.62	.49@.51	.53@.70
Islands, coarse	.80@.80	.70@.77	.77@.85
Cametá	.32@.33	.28@.30	.29@.36

*Figured only on Standard.

SINGAPORE

GUTHRIE & CO., LIMITED report (August 16, 1916).

At the auction held today prices declined on the average about \$6 per picul. Demand throughout was fair and of a quantity of 527 tons cataloged for sale 253 tons found buyers.

Standard sheet and crepe each sold up to \$115 and at this figure mark declines of \$7 and \$6 respectively. Plain smoked sheet met with a poor inquiry and only a few parcels were sold. Brown and lower grade crepes were in fairly good demand, but prices were about \$5 lower on the week. Scraps were neglected.

The following was the course of values:

	In Singapore per picul.*	Sterling equivalent per pound in London.	Equivalent per pound in cents.†
Sheet, fine ribbed, smoked	\$113@115	2/ 3½@2/ 3	55.24@56.00
Sheet, good ribbed smoked	110@112	2/ 2½@2/ 3	53.97@54.73
Sheet, plain smoked	101@108	2/ 0¾@2/ 2½	50.17@52.95
Sheet, ribbed unsmoked	97@98	1/11½@1/ 6	48.39@48.90
Sheet, plain unsmoked	100@103	2/ 0½@1/ 1	49.66@50.93
Crêpe, fine pale	113@115	2/ 3½@2/ 3½	55.24@56.00
Crêpe, good pale	105@111	2/ 1½@2/ 2	51.70@54.22
Crêpe, fine brown	102@106	2/ 0¾@2/ 1½	50.42@52.20
Crêpe, good brown	88@101	1/10 @2/ 6	44.60@50.17
Crêpe, dark	71@94	1/ 6¾@1/ 11	37.24@47.13
Crêpe, bark	60@87	1/ 4¾@1/ 9	32.68@44.09
Scrap, virgin	70@86	1/ 6¼@1/ 6	36.99@43.58
Scrap, pressed	50@	1/ 2 @	38.80@
Scrap, loose	50@	1/ 2 @	38.80@39.5

*Picul = 133½ pounds.

†Figured at standard rate of exchange, 1£ = 24 s. 6 d.

Quoted in S. S. L. B. at 156.7 cents.

PLANTATION RUBBER FROM THE FAR EAST.

TOTAL EXPORTS FROM MALAYA

(From January 1, 1916, to dates named. Reported by Guthrie & Co., Singapore. These figures include the production of the Federated Malay States, but not of Ceylon.)

To—	31, 1916.	30, 1916.	30, 1915.	From Penang June July	Totals.
United Kingdom	17,765,687	3,442,134	10,992,434	12,810,976	45,011,231
The Continent	7,256,905		46,667		7,303,572
Japan	2,572,014				2,572,014
Ceylon	267,962		334,933		1,374,115
United States	476,888		4,489,733		52,182,521
Australia	47,544				184,314
Totals	75,739,771	3,442,134	15,863,767	13,582,195	108,627,767

For same period, 1915 to 31, 1916 4,329,778 12,621,996 16,320,300 73,314,614
For same period, 1914 24,175,230 2,548,819 10,407,734 15,034,312 52,166,095
For same period, 1913 1,088,066 1,474,337 35,267,087

EXPORTS OF CEYLON GROWN RUBBER.

(From January 1, 1915, to 1915 and 1916. Reported by Guthrie & Co., Singapore.)

To—	1915.	1916.
United States	4,837,988	61,000
Canada and Mexico	10,114	
France	3,227	681,518
Russia	33,000	48,877
Italy		6,720
United Kingdom	3,165,247	3,111
Australia	459,577	605,571
India	1,000	728
Straits Settlements	119,933	
Japan	23,744	4,788
Totals	9,644,999	670,007

FEDERATED MALAY STATES RUBBER EXPORTS.

An official cablegram from Kuala Lumpur gives the figures of the export of plantation rubber from the Federated Malay States during the month of August as 5,792 tons against 3,083 tons in July last and 5,796 tons in the corresponding month last year. This gives a total of 37,926 tons for eight months of the current year against 26,675 tons in 1915 and 18,671 tons in 1914. Appendix A, the comparative statistics.

	1914.	1915.	1916.
January	2,542	3,473	4,471
February	2,364	3,411	5,207
March	2,418	3,418	4,429
Total	7,324	10,292	14,107

May	2,069	3,708	3,956
June	2,306	3,403	5,114
July	2,971	3,687	5,053
August	1,850	3,796	5,782
Total	18,671	26,673	37,926

IMPORTS AND EXPORTS OF RUBBER AND GUTTA AT SINGAPORE

IMPORTS

From—	Para Rubber Rubber, Treatment.	Borneo Rubber.	Gutta Percha.	Gutta Jelutong.
Malay Peninsula—				
Port Swettenham	1,364,465			
Muar	696,266			
Teluk Anson	663,200	9,066		
Kelantan	118,433	5,600		
Fort Dickson	102,666			
Kuantan	41,866			
Rengat	12,533	14,666		
Mersing	4,266			
Tringganu	133			
Totals	3,002,829	29,332		

From—	Para Rubber Rubber, Treatment.	Borneo Rubber.	Gutta Percha.	Gutta Jelutong.
Borneo—				
Sarawak	83,866	35,066	1,600	32,933
Pontianak	39,200	5,066	3,600	14,666
Sibu	38,133		1,733	4,933
Sambas	33,200			800
Labuan	26,666		266	2,800
Jessellton	22,800	94,533	266	533
Bandiarmassin	16,400	32,363	5,333	9,333
Sardakan	15,200	15,333	800	266
Kudat	4,533	1,466		266
Singawang	3,066			800
Passir	2,864			
Samarinda	1,330			3,333
Samput	400		400	1,200
Totals	287,594	203,727	13,698	71,597

From—	Para Rubber Rubber, Treatment.	Borneo Rubber.	Gutta Percha.	Gutta Jelutong.
Sumatra				
Deli	146,533	459,200		
Diambi	137,060			2,400
Asahan	51,000	80,666		
Belawan	12,533	66,666		
Siak	7,600			
Indraghiri	5,066			
Palembang	3,466		933	
Bengkalis	532			404,000
Muntok	400			
Port Bon			800	3,600
Totals	361,151	606,533	1,733	6,000

From—	Para Rubber Rubber, Treatment.	Borneo Rubber.	Gutta Percha.	Gutta Jelutong.
Straits Settlements—				
Malacca	1,068,933	593,266		
Penang	552,066	51,333		
Totals	1,620,999	644,599		
Java—				
Sourabaya	96,933			
Batavia	75,600			
Totals	172,533			

From—	Para Rubber Rubber, Treatment.	Borneo Rubber.	Gutta Percha.	Gutta Jelutong.
Siam				
Patani	1,330			
Phuket	133			
Totals	1,463			

From—	Para Rubber Rubber, Treatment.	Borneo Rubber.	Gutta Percha.	Gutta Jelutong.
Burma				
Mergui	2,933			
Totals	2,933			
Other Ports	158,533	189,600	5,866	10,666
Totals	5,609,014	1,673,790	21,597	88,263

EXPORTS.

July, 1916.

To—	Para Rubber Rubber	Trans- shipped.	Borneo Rubber.	Gutta Percha.	*Gutta Jelutong.
United States—					
New York	11,866	610,600		58,933	761,600
Albany	71,466	136,000			
San Francisco	1,466	30,933			73,866
Boston	4,533	29,066			29,333
Canada—					
Ontario (Toronto)	34,133				60,000
Totals	92,466	806,600		58,933	865,400

To—	Para Rubber Rubber	Trans- shipped.	Borneo Rubber.	Gutta Percha.	*Gutta Jelutong.
United Kingdom					
London	976,533	2,030,533		390,400	205,866
Liverpool	305,200	173,733		46,933	204,133
Russia (Vladivostok)	417,333				22,400
Totals	1,698,866	2,204,266		448,333	432,399
Other Ports	7,534,663	3,010,865	24,133	508,799	1,357,198

CRUDE RUBBER ARRIVALS AT THE PORT OF NEW YORK.

[The Figures Indicate Weights in Pounds.]

SEPT 1—By the steamer *Stephen* from Pará and Manaus:

	Fine	Medium	Coarse	Cauchó	Total
Muller & Schall	28,100	79,300	33,700	179,500	
Gibbs & Co.	16,300	6,400	61,400	523,000	
Arnold & Zeiss	16,300	93,500		228,200	
H. A. Astlett & Co.	16,300	88,500	5,500	192,500	
Arnold & Zeiss	15,100	30,400	3,100	190,300	
Paul Bertuch	116,100	1,400	15,800	25,000	158,300
Henderson & Korn		700	61,900	1,700	77,100
G. Amsinck & Co.	15,000	700	22,700	2,500	40,900
Robinson & Co.					45,600
Total	100,500	110,500	45,300	13,200	270,500

SEPT. 1. By the steamer *Steph* from Itacoatiara:

G. Amsinck & Co.	24,300	11,500	=	35,800
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SEPT 5—By the steamer *Rio de Janeiro* from Pará and Manaus:

Muller & Brown	83,500	244,400
Gibbs, Taiter & Co.	18,400	336,600
Arnold & Zeiss	29,300	71,500
Muller, Schall & Co.	6,300	11,200
Paul Bertuch	14,000	43,800
Crossman & Siedken		8,200
Neuss, Hesslein & Co.	3,300	16,900
G. Amsinck & Co.	1,700	33,800
H. A. Astlett & Co.	13,000	3,300
Henderson & Korn	5,200	2,900
W. R. Grace & Co.	800	800
Robinson & Co.	1,900	100
Totals	581,500	47,300 105,100 172,600 = 906,500

PARAS

POUNDS.

AUGUST 23.—By the <i>Colon</i> =Colon:	
G. Amsinck & Co. (Cauchó)....	28,000
G. Amsinck & Co. (Coarse)....	6,400
W. R. Grace & Co. (Cauchó)....	12,000
W. R. Grace & Co. (Fine)....	1,500
A. Gibbs & Co. (Fine)....	2,200
A. Gibbs & Co. (Coarse)....	400
Eastmond & Co. (Cauchó)....	3,000 53,500
AUGUST 28.—By the <i>Montanan</i> =Buenos Aires:	
Muller, Schall & Co. (Fine)....	60,000
Muller, Schall & Co. (Coarse)....	15,000 75,000
AUGUST 28.—By the <i>Kentuckian</i> =Montevideo:	
A. D. Straus & Co. (Fine)....	7,000
SEPTEMBER 1.—By the <i>Panaman</i> =Buenos Aires:	
Various Firms	16,000
SEPTEMBER 5.—By the <i>Ancon</i> =Colon:	
G. Amsinck & Co. (Fine)....	21,000
G. Amsinck & Co. (Coarse)....	3,000
W. R. Grace & Co. (Fine)....	3,000
Gravenhorst & Co. (Fine)....	1,700 28,700
SEPTEMBER 7.—By the <i>Highland Prince</i> =Rio Janeiro:	
W. R. Grace & Co. (Fine)....	4,000
SEPTEMBER 11.—By the <i>Hawaiian</i> =Buenos Aires:	
Neuss, Hesslein & Co. (Fine)....	2,000
SEPTEMBER 19.—By the <i>Cristobal</i> =Colon:	
G. Amsinck & Co. (Fine)....	28,500
W. R. Grace & Co. (Fine)....	1,500 30,000
SEPTEMBER 20.—By the <i>Colon</i> =Colon:	
G. Amsinck & Co. (Cauchó)....	30,000
Muller, Schall & Co. (Cauchó)....	21,000
Eastmond & Co. (Cauchó)....	31,000 82,000

CENTRALS.

[*This sign, in connection with imports of Centrals, denotes Guayule rubber.]

AUGUST 23.—By the <i>Colon</i> =Colon:	
J. Brown	2,000
Isaac Brandon & Bros.	700 2,700
AUGUST 25.—By the <i>Santa Maria</i> =Cartagena:	
A. Held	2,000
G. Amsinck & Co.	200 2,200
AUGUST 28.—By the <i>Metapan</i> =Port Limon:	
Isaac Brandon & Bros.	700
De Lima, Cortesoz & Co.	800 1,500
AUGUST 30.—By the <i>Iallac</i> =Frontera:	
Harburger & Stack	13,000
G. Amsinck & Co.	1,200
E. Steiger & Co.	800 15,000
AUGUST 31.—By the <i>Advance</i> =Colon:	
Piza Nephews & Co.	2,000
Fidanque Bros. & Co.	500 2,500
SEPTEMBER 1.—By the <i>Juan</i> =Colombia:	
Mecke & Co.	1,000
SEPTEMBER 1.—By the <i>Jove</i> =Colombia:	
A. Held	2,000
SEPTEMBER 5.—By the <i>Pastores</i> =Port Limon:	
Isaac Brandon & Bros.	500
SEPTEMBER 5.—By the <i>Monterey</i> =Mexico:	
Graham, Hinkley & Co.	*1,000
SEPTEMBER 5.—By the <i>Monterey</i> =Tampico:	
C. Tennent, Sons & Co.	*25,000

POUNDS.

SEPTEMBER 5.—By the <i>Ancon</i> =Colon:	
G. Amsinck & Co.	12,000
Pablo Calvet & Co.	12,000
A. M. Capen's Sons	10,000
Various Firms	2,600
A. Rosenthal & Sons	500 36,500
SEPTEMBER 15.—By the <i>Carrillo</i> =Cartagena:	
G. Amsinck & Co.	10,000
A. Held	1,000 11,000
SEPTEMBER 18.—By the <i>Esperanza</i> =Mexico:	
E. Steiger & Co.	27,000
General Export & Commission Co.	2,500
H. Marquardt & Co.	2,000
W. A. Aves & Co.	1,500
German Commercial Co.	500 33,500
SEPTEMBER 18.—By the <i>Siraola</i> =Cortez:	
Eggers & Heinlein	3,000
A. Rosenthal & Sons	3,500
R. G. Barthold	100 3,600
SEPTEMBER 18.—By the <i>Tenadores</i> =Port Limon:	
Isaac Brandon & Bros.	400
Eggers & Heinlein	100 500
SEPTEMBER 18.—By the <i>Jelling</i> =Mexico:	
J. A. Medina & Co.	7,000
G. Amsinck & Co.	1,000 8,000
SEPTEMBER 19.—By the <i>Cristobal</i> =Colon:	
G. Amsinck & Co.	25,000
A. M. Capen's Sons	2,700
W. R. Grace & Co.	3,000
Pablo Calvet & Co.	3,500
American Trading Co.	2,600
Muller, Schall & Co.	800
Meyer Hecht	300
R. G. Barthold	1,400
H. Wolff & Co.	1,100
Neuss, Hesslein & Co.	1,700
Harburger & Stack	500
A. Rosenthal & Sons	400
Gontard & Co.	600 43,600

AFRICANS.

SEPTEMBER 1.—By the <i>Carpattia</i> =Liverpool:	
Arnold & Zeiss	38,000
SEPTEMBER 5.—By the <i>Cloughton</i> =London:	
J. T. Johnstone & Co.	11,000
SEPTEMBER 11.—By the <i>Laconia</i> =Liverpool:	
Arnold & Zeiss	20,000
SEPTEMBER 18.—By the <i>Laconia</i> =Hull:	
J. T. Johnstone & Co.	25,000
Arnold & Zeiss	3,000 28,000
SEPTEMBER 18.—By the <i>Laconia</i> =Liverpool:	
Fred. Stern & Co.	6,000

MANICABA.

POUNDS.

SEPTEMBER 1.—By the <i>Stephen</i> =Farnabach:	
Rosbach Bros. & Co.	42,000
Adolph Hirsch & Co.	3,500
G. Amsinck & Co.	500 46,000
SEPTEMBER 1.—By the <i>Stephen</i> =Ceata:	
Various	37,000
SEPTEMBER 1.—By the <i>Rio de Janeiro</i> =Farnabach:	
Harburger & Stack	100,000
SEPTEMBER 7.—By the <i>Highland Prince</i> =Bahia:	
Adolph Hirsch & Co.	30,000

PLANTATIONS.

AUGUST 20.—By the <i>Imperia</i> =London:	
Meyer & Brown	22,500
The B. F. Goodrich Co.	200,000
Aldens' Successors, Ltd.	62,000
Michelin Tire Co.	56,000
Robinson & Co.	45,000
Charles T. Wilson Co., Inc.	33,500
Raw Products Co.	35,000
Henderson & Korn	6,000 460,000
AUGUST 26.—By the <i>Launceston</i> =London:	
A. Stern & Co.	11,000
AUGUST 28.—By the <i>Amnehaha</i> =London:	
L. Littlejohn & Co.	11,690
SEPTEMBER 1.—By the <i>City of Madras</i> =Colombo:	
Meyer & Brown	232,000
L. Littlejohn & Co.	67,200
J. T. Johnstone & Co.	2,200
Edward Maurer & Co., Inc.	45,000
Arnold & Zeiss	22,500
Henderson & Korn	30,000
Aldens' Successors, Ltd.	11,000
Various	13,500 423,400
SEPTEMBER 1.—By the <i>Mesaba</i> =London:	
Goodyear Tire & Rubber Co.	200,000
Rubber Trading Co.	50,000
Fred. Stern & Co.	38,000
G. R. Henke	16,000
Charles T. Wilson Co., Inc.	25,000 329,000
SEPTEMBER 5.—By the <i>Cloughton</i> =London:	
J. T. Johnstone & Co.	80,000
Arnold & Zeiss	33,500
Robinson & Co.	22,500
Various	2,000 138,000
SEPTEMBER 9.—By the <i>Porte</i> =London:	
Robinson & Co.	45,000
Arnold & Zeiss	45,000
General Rubber Co.	28,000 118,000
SEPTEMBER 11.—By the <i>Orduna</i> =Liverpool:	
Arnold & Zeiss	9,000
SEPTEMBER 11.—By the <i>Aeon</i> =London:	
Charles T. Wilson Co., Inc.	45,000
General Rubber Co.	7,000 52,000
SEPTEMBER 11.—By the <i>Mengha</i> =London:	
Goodyear Tire & Rubber Co.	100,000
Michelin Tire Co.	45,000
Rubber Trading Co.	45,000
Fred. Stern & Co.	22,500
Various	5,000 217,500
SEPTEMBER 14.—By the <i>Atlantian</i> =London:	
Rubber Trading Co.	45,000
SEPTEMBER 19.—By the <i>Royal Prince</i> =Singapore:	
Meyer & Brown	85,000
Edward Maurer & Co., Inc.	60,000
The B. F. Goodrich Co.	336,000
L. Littlejohn & Co.	312,731
J. T. Johnstone & Co.	325,000
Goodyear Tire & Rubber Co.	75,000
Arnold & Zeiss	75,000

	POUNDS.
Henderson & Korn	43,000
Charles T. Wilson Co., Inc.	25,000
Robinson & Co.	25,500
Rubber Trading Co.	20,000
Aldens' Successors, Ltd.	11,000
Raw Products Co.	16,000
H. R. Jefferts	13,500
General Rubber Co.	11,200
Fred. Stern & Co.	6,000
Fox & Co.	2,000
SEPTEMBER 21.—By the Andania—London:	1,438,931

Arnold & Zeiss	23,000
The B. F. Goodrich Co.	115,000
Michelin Tire Co.	70,000
Robinson & Co.	56,000
Charles T. Wilson Co., Inc.	30,000
	495,000

CRUDE RUBBER ARRIVALS AT SEATTLE.

Consignment given first, full weight to shippers.
Excess 30 pounds net to the use

PLANTATION.

TO SEATTLE.

AUGUST 27.—By the steamer Teest Maru	
The B. F. Goodrich Co.	
W. T. Easley	68,670
Henderson & Korn	
The East Asiatic Co.	16,510
W. R. Grace & Co.	
Penang Rubber Estates & M.	
Planters Stores & Agency Co.	11,050
Cumberbatch & Co.	9,100
Goodyear Tire & Rubber Co.	8,060
Planters Stores & Agency Co.	3,420
	731,810

TO AKRON.

AUGUST 8.—By the steamer Mexico Maru	
The B. F. Goodrich Co.	
W. T. Easley	551,980
TO NEW YORK.	
AUGUST 31.—By the steamer Panda Maru	
Arnold & Zeiss	
Weller & Co.	155,220

TO AKRON.

AUGUST 31.—By the steamer Talithybis	
Firestone Tire & Rubber Co.	
The Waterhouse Co.	72,410
Goodyear Tire & Rubber Co.	
Harrisons & Crossfield	255,710
Anglo Malay Rubber Co.	37,310
Rubber Estates of Johore	27,040
Duff Development Co.	15,860
Lankat Sumatra Rubber Co.	6,240
Anglo Sumatra Rubber Estates	5,330
Tamiam Rubber Estates	3,380
Bandar Sumatra Rubber Co.	2,080
Serdang Central Plantation Co.	2,080
Glen Berrie Rubber Co.	1,690
	429,130

TO NEW YORK.

Edward Maurer & Co., Inc.	
C. W. Mackie & Co.	23,270
Charles T. Wilson Co., Inc.	
Anglo Sumatra Rubber Co.	2,860
Insulind Rubber & Tobacco Co.	1,560
J. T. Johnstone & Co.	
Sungei Rapiat Plantation Co.	2,860
Arnold & Zeiss	
Weller & Co.	139,750
C. W. Mackie & Co.	55,120
W. E. Cansfield Co.	4,420

	POUNDS.
Arthur Meyer & Co.	
Duff Development Co.	16,250
Insulind Rubber & Tobacco Co.	1,560
L. Littlejohn & Co.	
Kuala Nal Kelantan Rubber Co.	4,290
W. E. Cansfield Co.	4,160
Robinson & Co.	
Serdang Central Plantation Co.	130
	256,230

TO SEATTLE.

The B. F. Goodrich Co.	
W. T. Easley	857,870
W. R. Grace & Co.	
Casson & Co.	33,540
Geo. Stewart Co.	11,700
Goodyear Tire & Rubber Co.	
C. W. Mackie & Co.	14,690
Planters Stores & Agency Co.	4,550
Arnold & Zeiss	
Third Mile Rubber Co.	6,240
	928,590

TO AKRON.

SEPTEMBER 9.—By the steamer Teest Maru	
Firestone Tire & Rubber Co.	
The Waterhouse Co.	140,140

TO AKRON.

SEPTEMBER 19.—By the steamer Canada Maru	
The B. F. Goodrich Co.	
W. T. Easley	362,700

GUTTA JELUTONG.

TO SEATTLE.

AUGUST 25.—By the steamer Tensho Maru	
L. Littlejohn & Co.	
Katz Bros.	33,150
Bowers Rubber Works	
Katz Bros.	12,480
	45,630

GUTTA PERCHA.

TO SEATTLE.

AUGUST 25.—By the steamer Teest Maru	
L. Littlejohn & Co.	
Katz Bros.	33,150

CUSTOM HOUSE STATISTICS.

PORT OF NEW YORK JULY, 1916.

IMPORTS:	POUNDS.	VALUE.
India rubber	11,255,551	\$6,470,125
Palata	148,639	62,109
Gutta percha	83,599	11,282
Manufactures of india rubber	14,873	14,873
Rubber scrap	115,288	15,181
Totals	11,603,077	\$6,573,570

EXPORTS:	POUNDS.	VALUE.
Palata	15,357	\$6,708
Rubber scrap	131,836	28,119
India rubber boots	1,239	2,638
India rubber shoes	238,021	92,761
Automobile tires	523,297	327,685
Other tires	327,685	191,038
Belting, hose, etc.	191,038	
All other manufactures of india rubber	534,541	
Total	\$1,706,787	

PORT OF SAN FRANCISCO JULY, 1916.

IMPORTS:	POUNDS.	VALUE.
India rubber	1,027,330	\$638,945

IMPORTS:	POUNDS.	VALUE.
Gutta jelutong (Pontianak)	38,482	\$1,800
Manufactures of india rubber		191
Totals	1,065,812	\$640,191

EXPORTS:

Reclaimed rubber	10,064	\$956
India rubber boots	144	318
India rubber shoes	2,055	1,551
Automobile tires		183,357
Other rubber tires		17,868
Belting, hose, etc.		29,402
All other manufactures of india rubber		10,148
Total		\$233,600

PORT OF SEATTLE JULY, 1916.

IMPORTS:	POUNDS.	VALUE.
India rubber	1,923,150	\$1,209,065
Gutta percha	126,959	12,206
Gutta jelutong (Pontianak)	1,254,037	63,062
Totals	3,304,146	\$1,284,333

EXPORTS:

India rubber boots	87	\$173
India rubber shoes	33	52
Automobile tires		20,632
Other rubber tires		198
Belting, hose, etc.		15,653
All other manufactures of india rubber		1,313
Total		\$38,021

PORT OF SEATTLE—AUGUST, 1916.

IMPORTS:	POUNDS.	VALUE.
India rubber	1,145,952	\$679,330
Manufactures of india rubber		5
Totals	1,145,952	\$679,344

PORT OF BOSTON AUGUST, 1916.

IMPORTS:	POUNDS.	VALUE.
India rubber	67,062	\$27,135
Manufactures of india rubber		1,851
Rubber scrap	7,703	712
Totals	74,765	\$29,708

EXPORTS:

Rubber scrap	4,354	\$1,315
India rubber boots	13,300	24,029
India rubber shoes	81,657	31,508
Automobile tires		1,681
Other rubber tires		125
Belting, hose, etc.		1,647
All other manufactures of india rubber		44,245
Total		\$104,550

PORT OF CINCINNATI AUGUST, 1916.

IMPORTS:	POUNDS.	VALUE.
Manufactures of india rubber		\$17

PORT OF CLEVELAND—AUGUST, 1916.

IMPORTS:	POUNDS.	VALUE.
India rubber	473,071	\$279,708

PORT OF PHILADELPHIA AUGUST, 1916.

EXPORTS:	POUNDS.	VALUE.
Belting, hose, etc.		\$3,472
Other manufactures of india rubber		10,370
Total		\$13,842

EXPORTS OF INDIA RUBBER FROM MANAOS DURING JULY, 1916.

NEW YORK.

EXPORTERS.	Fine.	Medium.	Coarse.	Caucho.	Totals.	Fine.	Medium.	Coarse.	Caucho.	Totals.	Grand Totals.
Suter & Co.	62,224	3,360	5,615	18,080	89,279	12,410		1,560	1,120	15,090	104,369
General Rubber Co. of Brazil	37,818	2,681	2,355	1,061	43,915	38,971	14,718	10,655	83,416	147,760	191,675
Tancredito Porto & Co.	62,803	9,621	11,464	394	84,282	2,588	19,218	73	22,387	44,266	128,548
J. G. Araujo	31,741	3,133	1,989	157	37,020	5,683	217	3,044	162	9,106	46,126
M. Lobo	10,182		1,032	23,196	34,410						34,410
Ohliger & Co.	22,213	1,440	828		24,481						24,481
G. Fradelizi	20,033				20,033		8,635	856	10,542	20,033	40,066
Adelbert H. Alden, Ltd.		302	1,249		1,551	1,212			15,276	16,496	18,047
Armazens Andresen	2,862	8	2,342	2,129	7,341						7,341
Simfronio & Co.	1,665	317	2,038	12	4,032						4,032
G. Deffner & Co.	2,240	83	77	260	2,660						2,660
Th. Levy, Camille & Co.							814	1,321	280	2,415	2,415
Matheus Silva & Co.									600	600	600
Totals	233,748	20,945	28,989	45,289	328,971	60,870	43,602	17,511	133,783	255,766	604,770
In transit, Iquitos	4,266	648	2,295	159,451	166,660	7,780	330	1,403	135,246	144,759	311,419
Total July, 1916	238,014	21,593	31,284	204,740	495,631	68,650	43,932	18,914	269,029	400,525	916,189
June, 1916	163,154	22,947	88,415	102,665	377,181	50,958	60,676	9,035	228,956	349,625	726,806
May, 1916	430,544	69,135	142,723	280,793	923,195	28,635	29,243	17,539	198,313	273,730	1,196,925
April, 1916	334,337	48,556	168,393	377,014	928,300	212,682	50,555	35,419	252,036	550,692	1,478,992
March, 1916	502,323	76,236	228,580	320,482	1,127,621	450,320	87,029	49,033	318,648	905,030	2,032,651
February, 1916	546,003	82,739	191,537	205,419	1,025,698	164,400	27,819	56,344	119,229	367,792	1,393,490
January, 1916	561,143	110,411	176,779	148,142	996,475	543,822	58,574	75,105	123,703	801,204	1,797,679

(Compiled by Suter & Co., Manaoas.)

Official India Rubber Statistics for the United States.

For the Fiscal Years 1914-15-16 and June, 1915-16.

IMPORTS OF CRUDE AND MANUFACTURED RUBBER.

Description	1915-16		1916		1914		1915		1916	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
MANUFACTURED										
Belgium					1,078,751	26,461,760	1,902,371	\$950,872		
France	53	\$5,08	31,616	\$23,453	2,629,287	1,124,629	685,699	284,862	509,675	\$312,144
Germany					7,079,260	3,614,510	739,105	358,931		
Portugal	84,408	211,052			556,560	177,687	4,130,624	1,374,526	2,773,656	1,094,841
United Kingdom	8,800,800	6,707,179	8,321,535	6,011,710	48,279,674	31,152,336	75,168,236	39,188,519	72,459,408	48,144,416
Central Am. and Br. W. Inds.	7,720	19,698	142,765	67,514	565,487	297,849	949,865	414,441	1,313,454	597,827
Mexico	7,720	19,698	185,202	90,602	640,448	333,327	1,668,415	650,975	3,261,507	1,262,291
Japan	770,841	1,895,683	1,483,740	2,363,662	40,641,305	16,319,048	48,753,670	20,738,776	54,968,227	25,150,493
Other So. America	8,438	108,371	548,577	278,677	1,845,422	806,888	4,708,390	2,008,790	6,253,462	2,892,877
East Indies	109,714	684,580	16,170,761	10,164,836	16,597,105	9,675,709	7,898,683	14,051,598	125,532,067	75,092,942
Other countries	11,850	6,450	47,053	37,355	2,182,441	1,155,198	5,463,37	3,007,979	704,101	496,959
Totals	18,788,811	\$9,705,718	30,285,218	\$18,661,156	131,995,742	\$71,219,851	172,068,428	\$83,030,269	267,775,557	\$155,044,790
CRUDE										
Guayule gum	299,381	79,008	306,178	91,044	1,475,804	607,076	5,111,849	1,441,367	2,816,068	880,813
Gutta jelutong (Pontianak)	1,007,234	77,232	5,160,014	261,615	24,926,571	1,155,402	14,851,264	731,995	27,858,335	1,322,262
Gutta percha	4,543	1,013	622,782	80,243	1,846,109	323,567	1,619,214	230,750	3,188,449	342,226
Totals	1,301,158	\$80,253	5,468,974	\$261,862	16,347,684	\$1,785,645	16,582,327	\$1,403,102	30,862,652	\$1,545,301
Rubber scrap	1,177,808	74,895	782,286	65,512	25,958,261	2,063,198	11,006,928	726,914	16,371,573	1,271,903
Totals, unmanufactured	1,301,158	\$80,253	5,468,974	\$261,862	16,347,684	\$1,785,645	16,582,327	\$1,403,102	30,862,652	\$1,545,301
Totals	19,089,969	\$9,785,971	35,754,192	\$18,923,018	148,343,426	\$73,005,496	188,650,755	\$84,433,371	298,638,209	\$156,589,091
CRUDE										
Guayule gum										
Gutta jelutong (Pontianak)										
Gutta percha										
Totals, manufactured		\$52,162		\$80,552		\$1,559,812		\$802,122		\$455,895
CRUDE										
Guayule gum										
Gutta jelutong (Pontianak)										
Gutta percha										
Totals, unmanufactured		\$2,517		\$737		\$87,642		\$30,349		\$16,179

EXPORTS OF DOMESTIC MERCHANDISE

MANUFACTURED										
Belgium										
Germany										
Russia in Europe				\$1,233						\$1,125,733
England		\$365,606		666,408		1,503,440		2,655,099		9,178,117
Canada		110,852		87,980		961,937		772,574		1,176,836
Mexico		7,117		10,772		190,813		190,813		16,811
China		29,790		52,547				106,083		547,410
Australia		64,519		108,315				245,240		1,551,154
New Zealand				45,859						944,008
Philippine Islands		25,025		36,594		141,205		250,832		391,634
Other countries		135,953		307,015		638,826		736,539		2,784,524
Totals		\$738,862		\$1,167,733		\$3,505,267		\$4,963,270		\$17,936,227
All other tires		119,050		199,529		563,377		576,602		3,003,077
Belt ing, hose and packing		178,517		400,315		1,377,987		1,807,848		2,989,173
Rubber boots		9,092	31,284	66,792		79,206	318,727	726,765	720,130	1,619,260
Rubber shoes		48,071	171,486	83,614		34,789	2,219,900	2,053,560	1,976,696	1,046,102
Scrap and old rubber	365,527	49,640	396,032	44,491	1,077,678	698,87	2,422,091	291,421	4,561,177	424,650
Reclaimed rubber		77,291	365,267	46,620		87,440	5,970,380	822,561	6,406,946	871,262
Crude rubber manufactures		480,582		797,428		1,473,47		3,525,486		7,290,345
Totals, manufactured		\$1,701,105		\$2,955,512		\$12,441,229		\$14,767,513		\$35,180,096
CRUDE										
Guayule gum		\$20,218	18,556	\$11,860	332,935	\$326,966	244,744	\$251,309	207,339	\$147,584

EXPORTS OF FOREIGN MERCHANDISE

MANUFACTURED										
Belgium		\$23,017	37,057	\$20,188			1,076,619	\$426,735	667,168	\$245,320
Guayule gum	5,006	1,940			56,369	22,378	29,891	8,931	18,500	7,776
Gutta jelutong			36,000	2,520	3,338	2,195			58,773	2,825
Gutta percha					14,314	5,060	9,457	4,603	60,023	11,446
India rubber	20,000	194,457	296,461	154,521	3,747,749	1,081,150	6,393,145	3,361,107	4,662,889	2,661,301
Rubber scrap and refuse	3,483	573			24,710	2,450	3,483	373	9,204	734
Totals, unmanufactured	20,006	\$219,787	389,518	\$177,229	4,099,099	\$1,587,37	7,512,595	\$3,801,749	5,476,557	\$2,929,405
Totals	20,012	\$221,705	389,575	\$197,417	4,155,434	\$1,589,747	7,512,595	\$3,801,749	5,476,557	\$2,929,405
MANUFACTURED										
Gutta percha		\$1,983		\$1,462		\$7,638		\$7,489		\$537
India rubber								364		38,649
Totals, manufactured		\$1,983		\$1,462		\$7,638		\$7,853		\$39,186

EXPORTS OF RUBBER GOODS TO NON-CONTIGUOUS TERRITORIES OF THE UNITED STATES

MANUFACTURED--	1915--		1916--		1914--		Twelve Months Ending--		1916--	
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
To Alaska:										
Belting, hose and packing.		\$14,072		\$8,253		\$110,545		\$107,176		\$128,740
Boots and shoes.....pairs	5,020	90,124	6,252	17,267	55,476	174,033	55,719	152,241	74,759	197,060
Other rubber goods.....		3,738		4,671		31,200		17,179		40,449
Totals		\$37,934		\$30,191		\$315,778		\$376,596		\$366,258
To Hawaii:										
Belting, hose and packing.		\$9,114		\$6,723		\$60,700		\$69,560		\$90,952
Automobile tires		2,590		34,209		357,987		439,550		523,793
Other tires		4,495		11,266		53,196		66,520		86,086
Other rubber goods.		6,852		8,342		58,364		50,484		90,660
Totals		\$62,981		\$60,540		\$530,253		\$625,114		\$791,491
To Philippine Islands:										
Belting, hose and packing.		\$5,583		\$1,630		\$50,944		\$58,600		\$57,686
Boots and shoes.....pairs	800	958	1,000	7,676	64	12,594	22,865	22,010	28,140	22,681
Tires		32,698		54,872		235,006		380,740		422,918
Other rubber goods.....		12,425		8,558		123,814		120,326		247,023
Totals		\$51,614		\$72,736		\$422,358		\$581,676		\$750,308
To Porto Rico:										
Belting, hose and packing.		\$1,260		\$4,533		\$27,830		\$28,060		\$42,539
Automobile tires		14,437		36,698		296,201		251,420		403,530
Other tires		2,410		553		44,330		26,665		30,462
Other rubber goods.....		2,826		11,384		37,887		56,141		74,975
Totals		\$10,933		\$33,568		\$406,257		\$362,286		\$551,506

*Not separately stated prior to January 1, 1916.

†Pontianak imported 30 days after May 12, 1916, in satisfaction of 50 per cent ad valorem.

WORLD'S RUBBER PRODUCTION AND DISTRIBUTION.

For the year ended December 31, 1915.

PRODUCTION.			DISTRIBUTION.		
	Per Cent.	Tons.		Per Cent.	Tons.
Plantation	67.9	107,867	America	61.0	96,792
Brazilian	23.5	37,220	Great Britain	9.5	15,072
Rest (including Central American, African and Mexican)	8.6	13,615	Russia	6.3	10,000
			Germany and Austria	3.7	6,000
			France	6.8	10,770
			Italy, etc.	4.1	6,500
			Scandinavia	4.1	6,568
			Japan and Australia	1.7	2,500
			Canada	2.8	4,500
			Belgium		
		158,702			158,702

Balata, Gutta Percha, Ganyole, Reclamard and Waste Rubber are not included.

RUBBER RETAINED MONTHLY.

1915.

	United States.	Great Britain.	Russia.*	France.*	Germany.	Italy.*	Canada.*	Totals.	Totals on month.
January	3,328	5,837	662	18	245	18	428	10,724	10,724
February	6,576	1,248	125	235	185	636	185	9,454	20,178
March	11,366	3,267	531	709	195	728	242	15,832	36,010
April	8,952	1,487	1,093	1,159	728	332	366	11,238	47,248
May	7,186	165	1,157	322	697	330	431	8,602	55,850
June	8,224	1,012	722	697	708	330	431	13,113	68,963
July	7,506	784	1,029	1,240	697	330	431	10,440	79,404
August	7,664	3,160	645	1,693	400	330	431	10,795	90,198
September	8,664	1,293	1,061	753	431	330	431	13,127	103,325
October	7,617	889	1,093	567	245	431	431	13,845	117,170
November	8,364							12,170	129,340
December	10,771							14,458	143,798
Totals	96,792	15,072	10,257	5,960	6,580	4,332	143,798	149,702	

1916.

	United States.	Great Britain.	Russia.*	France.*	Germany.	Italy.*	Canada.*	Totals.	Totals on month.
January	9,252	2,760	466	1,360	620	44	14	14,511	14,511
February	9,376	164	467	1,407	440	36	36	12,207	26,718
March	12,071	3,057	112	1,443					
April	10,500	3,699							
May		269							
June		533							
July		1,791							
Totals	41,106	12,273	1,045	5,960	1,060			26,718	

*Including Gutta Percha. †Estimated.

Compiled by W. H. Rickinson & Son, London, England.

IMPORTS AND EXPORTS OF CRUDE AND MANUFACTURED RUBBER AT THE PORT OF NEW YORK.

IMPORTS.

Week Ending	Latex Rubber		Semi-Manufactured		Baksta		Gutta-Percha		Chicle	
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
August 1, 1916	3,656,433	\$1,564,204.814	151,272	\$15,385	109,305	\$54,709	151,872	\$6,384	3,576	\$1,242
September 1, 1916...	4,248	625,575	138,699	9,352	43,339	20,883	2,611	57,406	35,592	
September 8, 1916...	9,724	853,354	42,230	6,370	26,690	9,307	167			
September 15, 1916...	9,043	1,270,821	139,757	7,628	41,487	16,438	23,462	9,692		

*Pounds not specified.

EXPORTS.

FIGURES ISSUED FROM AUGUST 15, 1916, TO SEPTEMBER 23, 1916.

EXPORTED TO	Belting, Hose and Packing.	Footwear.		Tires.		Insulated Wire and Cables.	Other mfn. of India Rubber	Fountain Pens.	Chewing Gum.	Reclaimed Rubber.	Scrap Rubber.
		Boots.	Shoes.	Auto.	Other.						
NORTH AMERICA:											
Bermuda	\$60		\$16		\$77		\$254	\$1	\$91		
British Honduras							63				
Canada							149				
Central American States:											
Costa Rica	465		30	\$943	115	\$1,454	830		461		
Guatemala	961			27,685	76	212	2,196		423		
Honduras	343			1,793	2	285	488		13		
Nicaragua							521		248		
Panama	6,002	\$60	775	2,019	687	6,657	6,275	1	2,536		
Salvador	621			560	69	10	2,850	1			
Mexico	7,101		349	4,867		2,106	3,849		44		
Newfoundland			9,967	402		316	1,827	40	344		
West Indies—											
British—											
Bahamas				280	5		341				
Jamaica	778		541	5,542	1,163	68	1,339		11		
Trinidad and Tobago	1,800		375	725	285	22	929				
Other British	140		518	532	1,003	130	423	34			
French	26,213		39	63,391	29,869	32,884	45,651	160	937		
Dutch	64			198	8		178		9		
Portuguese				126	186		79				
Spanish				547		45					
United States	279			13	11		261		44		
Santo Domingo	1,301			1,784	88	110	413		136		
Totals, North America	\$46,183	\$60	\$12,610	\$11,407	\$33,644	\$44,299	\$69,485	\$248	\$5,297		
EUROPE:											
Denmark	\$790				\$9,000		\$710	\$1,267			
France	1,939	\$3,562	\$18,959	\$18,008	37,918	\$16,179	40,321	400	\$2,244	\$8	\$5,444
Germany			8,993	1,369	31,340	6,078	12,341	786	1,332		
Netherlands	1,438		2,681	11,970	1,325	8,423	2,558	1,378	225		
Norway	2,267			7,431	51	23,686	3,569				
Portugal	232			1,935	447		97	280			
Russia in Europe	3,079			1,403		6,175	313				
Spain	213					1,212	1,913	1,100			
Sweden	515			3,585			50				
United Kingdom:											
England	33,798	172	30,531	105,484	61,183	22,201	193,941	472	60,480	6,500	5,168
Scotland		195	581								
Totals, Europe	\$44,266	\$3,929	\$61,745	\$151,185	\$41,264	\$84,954	\$275,810	\$5,683	\$64,281	\$6,508	\$10,612
SOUTH AMERICA:											
Argentina	\$4,803		\$1,292	\$67,955	\$15,045	\$13,381	\$25,772	\$51	\$2,333		
Bolivia				428	7	52	77				
Brazil	12,56		2,960	25,410	669	34,020	14,361	3,427	20		
Chile	10,813		124	4,754	514	6,972	5,098	142			
Colombia	1,257		209	2,887	271	6,897	3,067				
Ecuador	686			1,600	213	265	1,123		100		
Guiana	1,41			946	58	40	190	24			
Dutch				162			197				
Peru	4,164	\$142	146	11,483	55	1,237	4,063		425		
Uruguay	1,470		259	3,186	2,676	2,526	4,807	92			
Venezuela	926			5,881	1,873	1,323	2,526	7	52		
Totals, South America	\$46,803	\$142	\$4,990	\$124,691	\$21,381	\$66,713	\$61,281	\$3,745	\$2,930		
ASIA:											
Aden											
China	\$116	\$7		996	\$4						
British India	1,367		\$21	4,268	182	\$1,233	\$5,069	\$1,167	\$194		
Straits Settlements							101				
Dutch East Indies			112	25,247	3,292	8,516	887	450			
Hongkong							175	580	49		
Japan		543	12,713				646				
Russia in Asia						42	51				
Siam							483				
Totals, Asia	\$1,500	\$550	\$12,846	\$30,693	\$3,478	\$9,791	\$7,412	\$2,197	\$248		
OCEANIA:											
British—											
Australia and Tasmania	\$9,630	\$508	\$3,970	\$14,177	\$508	\$7,095	\$20,951	\$484	\$4,294		
New Zealand	530	137	59	8,604	5,925	1,276	5,534		349		
Philippine Islands	847		4,424		73	126	11,971		1,689		
British Oceania					170						
Totals, Oceania	\$11,067	\$645	\$8,453	\$22,781	\$6,676	\$8,497	\$38,456	\$484	\$6,432		
AFRICA:											
British Africa—											
West				\$46							
South	\$76,686		\$53	23,159	\$170	\$76	7,286		\$51		
East				260							
Egypt				752							
Portuguese Africa			1		16				21		
Totals, Africa	\$76,686		\$54	\$24,217	\$186	\$762	\$7,291		\$75		

LONDON AND LIVERPOOL RUBBER STATISTICS.

IMPORTS.

AUGUST, 1916.

UNMANUFACTURED—	London.		Liverpool.	
	Pounds.	Value.	Pounds.	Value.
Crude rubber:				
From German West Africa			4,000	\$1,682
Java	677,300	\$430,928		
Dutch Borneo	8,800	5,987		
Other Dutch Posses-				
sions in Indian Seas	627,400	422,227		
French West Africa			59,000	24,363
Portugal			11,200	3,159
Portuguese W. Africa			2,400	899
Portuguese E. Africa	10,000	3,645		
Spain			1,700	729
Spanish West Africa			400	136
Panama			700	316
Peru			309,900	173,732
Brazil			1,309,500	726,257
Egypt	200	146		
Gold Coast			99,800	30,239
Nigeria			25,800	9,234
Cape of Good Hope	21,300	15,387		
Zanzibar and Pemba	2,000	1,759		
United States	10,600	3,888	32,100	16,816
British East Africa	5,600	1,750	5,000	2,236
Anglo-Egyptian Sudan	2,600	1,108		
British India	93,200	56,342		
Straits Settlements	2,359,700	1,402,543	509,800	256,501
Fed. Malay States	3,857,800	2,376,171	6,900	3,392
Ceylon and Dependen-				
cies	1,922,000	1,187,293	88,600	58,923
British North Borneo	80,100	51,681		
New South Wales	3,100	1,959		
British West Indies	200	97		
British Guiana	900	471		
Totals	9,682,800	\$5,963,382	2,466,800	\$1,308,614

Waste and reclaimed rubber:				
From France	32,700	\$2,324		
Portugal	10,600	1,215		
Japan	3,800	365		
United States	11,200	6,454	61,400	\$12,617
Brazil	7,700	1,142		
Argentina			49,400	2,041
Channel Islands	200	19		
Cape of Good Hope	1,100	185		
Natal	1,300	151		
Ceylon	22,200	1,414		
Straits Settlements		15		
British India	17,500	1,162	4,800	535
New Zealand	2,800	146		
British Guiana	200	73		
Totals	132,700	\$14,665	115,600	\$15,193

EXPORTS.

Waste and reclaimed rubber:				
Mnfs. of the United King-				
dom:				
To Russia			219,200	\$36,826
Sweden			1,200	306
Denmark			67,200	12,476
France	26,500	\$4,860	800	146
Spain			21,900	1,555
Italy	268,800	15,066	19,100	1,798
Japan			20,800	3,961
United States	291,100	25,471	129,400	14,804
Totals	586,400	\$45,397	479,600	\$71,872

RE-EXPORTS.

Crude rubber:				
To Russia	57,700	\$233,363	740,100	\$507,899
Sweden	67,300	60,653	150,500	109,678
Denmark	33,600	20,412		
Norway			3,400	2,294
France	1,749,700	792,953	263,100	166,956
Spain	3,900	3,927	19,300	12,782
Italy	16,300	55,399	145,900	83,407
United States	2,554,800	1,613,938	203,100	59,896
Transvaal	300	248		
Canada	30,700	231,443	200	173
Victoria			58,500	40,500
New South Wales			2,400	1,652
Totals	5,233,200	\$3,012,336	1,586,500	\$985,237

Waste and reclaimed rubber:				
To France			32,000	\$7,475
Italy			9,500	1,361
Totals			41,500	\$8,836

RUBBER STATISTICS FOR CANADA.

IMPORTS OF CRUDE AND MANUFACTURED RUBBER.

UNMANUFACTURED—free:	June, 1916.		Three Months Ending June, 1916.	
	Pounds.	Value.	Pounds.	Value.
Rubber and gutta percha, crude caoutchouc or india rubber:				
From Great Britain	220,402	\$143,087	1,290,647	\$924,206
United States	279,257	161,676	1,060,150	660,790
Straits Settlements			33,849	21,607
Other countries			2,217	1,891
Totals	499,659	\$304,763	2,368,863	\$1,608,494
Rubber, re-covered:				
From Great Britain			18,740	\$3,610
United States	332,706	\$40,596	1,055,060	146,905
Totals	332,706	\$40,596	1,073,800	\$150,515
Hard rubber, in sheets and rods:				
From United States	401	\$313	2,029	\$1,713
Rubber substitute:				
From United States	39,738	\$3,270	169,841	\$14,624
Rubber, powdered, and rubber or gutta percha waste:				
From Great Britain			81,052	\$5,274
United States	15,967	\$865	397,536	28,377
Other countries			3,928	168
Totals	15,967	\$865	482,516	\$33,819
Rubber thread, not covered:				
From United States	2,318	\$3,611	11,650	\$17,831
Balata, crude:				
From United States	2,243	\$1,636	4,719	\$3,433
Chicle, crude:				
From United States	138,361	\$52,422	157,349	\$60,149
British Honduras	45,753	16,523	810,631	298,533
Mexico			161	90
Totals	184,114	\$68,945	968,141	\$358,772

MANUFACTURED—dutiable:	June, 1916.		Three Months Ending June, 1916.	
	General Tariff Value.	Preferential Tariff Value.	General Tariff Value.	Preferential Tariff Value.
Waterproof clothing:				
From Great Britain	\$12	\$32,317	\$20	\$81,358
United States	35,426		84,845	
Totals	\$35,438	\$32,317	\$84,865	\$81,358
Hose, lined with rubber:				
From United States	\$9,948		\$27,677	
Mats and matting:				
From Great Britain				\$0
United States	\$407		\$1,398	
Totals	\$407		\$1,398	\$0
Belting				
From Great Britain		\$157		\$161
United States	\$8,999		\$23,163	
Totals	\$8,999	\$157	\$23,163	\$161

Tires of rubber for all vehicles:				
From Great Britain		\$1,824	\$3,214	\$6,684
United States	\$103,927		273,808	
France	1,215		1,832	
Other countries	95		182	
Totals	\$105,237	\$1,824	\$279,036	\$6,684

*Rubber cement, and all other manufactures of india rubber and gutta percha, N. O. P.:				
From Great Britain	\$71	\$19,862	\$985	\$69,175
United States	70,787		206,817	
Other countries			401	
Totals	\$70,858	\$19,862	\$208,203	\$69,175

Hard rubber, in tubes:				
From United States			\$923	
Boots and shoes:				
From Great Britain		\$443		\$936
United States	\$10,329		\$25,947	
Totals	\$10,329	\$443	\$25,947	\$936
Belting:				
From Great Britain		\$13		\$247
United States	\$3,637		\$11,642	
Totals	\$3,637	\$13	\$11,642	\$247

Webbing over one inch wide				
From Great Britain	\$1,994	\$3,105		
United States	25,139	60,628		
Totals	\$25,161	\$1,994	\$60,650	\$3,105

*In addition the imports of rubber cement and all manufactures of India rubber and gutta percha not otherwise provided for amounted to \$229 from various countries for June; and \$58 from Great Britain and \$1,547 from various countries for the three months ending June, 1916, the values being at treaty rates.

EXPORTS OF DOMESTIC AND FOREIGN RUBBER GOODS.

	June, 1916.	Three Months Ending June, 1916.		
MANUFACTURED RUBBER	Produce of Canada. Value.	Re-exports of foreign goods. Value.	Produce of Canada. Value.	Re-exports of foreign goods. Value.
Belting:				
To Newfoundland	\$756		\$1,387	
Hose:				
To Great Britain	\$32,979		\$107,506	
United States			1,335	\$125
Newfoundland	96		981	
Other countries	2,072		2,819	
Totals	\$35,147		\$112,641	\$125
Boots and shoes:				
To Great Britain	\$7,178		\$34,436	
United States	51	\$237	71	\$252
Newfoundland	49		2,083	
Australia	1,009		3,319	
New Zealand	1,035		1,660	
Other countries	107		3,175	
Totals	\$9,429	\$237	\$44,783	\$252
Clothing:				
To United States		\$16		\$16
Newfoundland			\$150	
Totals		\$16	\$150	
Tires:				
To Great Britain	\$3,701		\$14,546	
United States	5,148	\$515	30,228	\$2,841
Newfoundland	1,157		493	
Other countries	26,241		55,503	
Totals	\$36,247	\$515	\$111,770	\$2,841
*Rubber waste:				
To Great Britain			\$9,026	
United States	\$15,436		54,023	
Totals	\$15,436		\$63,049	
All other mfrs., N. O. P.:				
To Great Britain	\$11,114		\$1,436	
United States	105	\$298	532	\$1,448
Newfoundland	377		847	
New Zealand	4		4	
Other countries	425		1,122	\$16
Totals	\$12,045	\$298	\$25,441	\$16
†Gum chicle:				
To United States	\$136,442		\$367,121	
Other countries	1,704		1,704	
Totals	\$138,146		\$368,825	

*During June 148,700 pounds of rubber waste was exported to the United States; and 75,100 pounds to Great Britain and 730,700 pounds to the United States for the three months ending June, 1916.

†During June 259,709 pounds of gum chicle was exported to the United States, and 2,250 pounds to various countries, making a total of 641,992 pounds to the United States and 2,250 pounds to various countries for the three months ending June, 1916.

RUBBER STATISTICS FOR ITALY.

IMPORTS OF CRUDE AND MANUFACTURED RUBBER

	Five Months Ending May, 1915.	Five Months Ending May, 1916.		
UNMANUFACTURED—	Pounds.	Value.	Pounds.	Value.
India rubber and gutta percha—raw and reclaimed:				
From Straits Settlements...	1,059,960		933,900	
African Fr. Colony...			29,700	
Belgian Congo			131,340	
Brazil	2,886,486		2,757,040	
Other countries	159,280		852,720	
Totals	4,108,720	\$2,883,574	4,704,700	\$3,301,844
Rubber scrap	307,320	\$31,370	2,682,360	\$203,880
MANUFACTURED—				
India rubber and gutta percha—threads:				
From United States	16,060		26,620	
Great Britain	14,520		15,400	
Other countries			3,740	
Totals	30,580	\$52,754	45,760	\$80,268

	Five Months Ending May, 1915.	Five Months Ending May, 1916.		
MANUFACTURED—	Pounds.	Value.	Pounds.	Value.
India rubber and gutta percha—sheets:				
Cut sheets	760	\$1,642	1,540	\$2,297
Elastic fabric	3,300	1,303	220	87
Insulated wire	220	58		
Hard rubber	1,760	1,235	25,740	18,065
India rubber and gutta percha—tubes:				
Cut sheets	660	\$1,042	660	\$1,042
Elastic fabric:				
From Austria-Hungary ..	580			
Great Britain	5,500			
Other countries	25,520		3,080	
Totals	31,900	\$16,791	3,080	\$1,621
Other forms:				
Cut sheets	2,200	\$1,351	2,420	\$1,486
Belting	24,860	\$15,266	60,060	\$36,882
Rubber coated fabrics...pieces	30,380	\$48,366	55,000	\$67,550
Other forms:				
From Great Britain	13,200		13,640	
Other countries	440		220	
Totals	13,640	\$11,966	13,860	\$12,159
Boots and shoes:—pairs				
From United States	8,271		14,140	
Austria-Hungary	1,531			
France	88		10,138	
Germany	4,224			
Other countries	84		63	
Totals	14,198	\$12,760	24,341	\$18,486
Elastic webbing				
From Austria-Hungary	5,500			
France	7,260		6,600	
Germany	25,520		880	
Other countries	10,340		8,360	
Totals	48,620	\$31,088	15,840	\$20,844
Elastic fabric, not specified				
From Austria-Hungary	8,580			
France	5,940		152,460	
Germany	15,180		220	
Great Britain	41,800		58,740	
Other countries	3,520		3,300	
Totals	75,020	\$59,508	214,720	\$169,531
Other rubber manufactures:				
From Austria-Hungary	12,980			
France	1,580		742,060	
Germany	62,700		220	
Great Britain	139,700		356,620	
Other countries	25,080		314,600	
Totals	341,940	\$211,945	1,413,280	\$991,866
Totals		\$3,713,671		\$5,752,418

EXPORTS OF CRUDE AND MANUFACTURED RUBBER.

	Five Months Ending May, 1915.	Five Months Ending May, 1916.		
MANUFACTURED—	Pounds.	Value.	Pounds.	Value.
India rubber and gutta percha	108,440	\$164,688	554,840	\$164,688
MANUFACTURED—				
India rubber and gutta percha—threads:				
To Germany	5,720			
Great Britain			1,760	
Argentina	1,100		3,740	
Other countries	28,600		12,320	
Totals	35,420	\$60,148	17,820	\$31,266
India rubber and gutta percha—sheets:				
Cut sheets	4,400	\$7,562	3,080	\$4,593
Elastic fabric	1,540	458	440	174
Insulated wire	1,100	290		
Hard rubber	20,240	14,206	34,100	23,432
India rubber and gutta percha—tubes:				
Cut sheets			8,140	\$1,285
Elastic fabric	52,580	\$27,670	29,700	15,633
Other forms	24,860		58,960	36,207
Belting	1,540	94	1,540	94
Other forms	50	45		

MANUFACTURED	Five Months Ending May, 1915.		Five Months Ending May, 1916.	
	Pounds.	Value	Pounds.	Value.
Elastic webbing:				
To France	660	.....	3,740	.....
Greece	2,880	.....	34,540	.....
Egypt	1,540	.....	10,560	.....
Argentina	19,140	.....	52,360	.....
Brazil	29,260	.....	43,560	.....
Cuba	17,160	.....	15,180	.....
Other countries	24,640	.....	75,020	.....
Totals	115,280	\$151,698	234,960	\$308,897
Elastic fabric—not specified				
To Spain	660	.....	.....	.....
Argentina	1,540	.....	10,560	.....
Brazil .....	.....	.....	220	.....
Uruguay	1,160	.....	1,760	.....
Other countries	2,200	.....	8,140	.....
Totals	5,500	\$9,650	20,680	\$36,284
Tires:				
To France .....	.....	.....	96,800	.....
Great Britain .....	.....	.....	2,668,600	.....
Switzerland	214,940	.....	66,000	.....
India and Ceylon	95,040	.....	148,720	.....
Austrasia	12,320	.....	43,780	.....
Argentina	320,760	.....	518,980	.....
Brazil	151,800	.....	298,320	.....
Other countries	1,866,260	.....	194,480	.....
Totals	2,661,100	\$4,666,15	4,000,880	\$7,086,784
Other rubber manufactures				
To Great Britain .....	.....	.....	27,940	.....
Switzerland	71,280	.....	12,100	.....
Argentina	37,180	.....	40,000	.....
Other countries	178,860	.....	98,120	.....
Totals	287,320	\$201,646	188,160	\$127,000
Total Exports .....	.....	\$5,229,281	.....	\$7,862,697

THE MARKET FOR RUBBER SCRAP.

Copyright 1916.

NEW YORK.

SEPTEMBER has shown a marked improvement in the rubber scrap market as compared with the preceding month. Early in the month there was considerable activity noticed on the part of dealers who had been covering on old contracts. The actual volume of business, however, has not been large, but following the improved position of crude rubber and the fact that the large buyers are yet to be heard from, it would seem that better conditions are due in the near future.

BOOTS AND SHOES. Purchasers of this material confined their orders to supplies sufficient only for immediate needs. Although some irregularity was noted early in the month, prices appeared to be well established at 9 cents delivered, as holders were confident in the firmness displayed by this particular grade.

AUTO TIRES. There was considerable improvement in this material and toward the latter part of the month the market was quite firm. Mixed tires were quoted 6@6½ cents for mill deliveries, while white G. and G. tires were considered high at 8½ cents. Some small lots of inner tubes have been moved at somewhat lower prices than a month ago. Solid tires have improved somewhat and sales were reported at unchanged prices that later in the month developed firmness. The other grades have remained practically featureless.

MECHANICALS. Dullness has characterized this material during the entire month, black scrap and garden hose being particularly stagnant.

For the twelve months ended June 30, 1916, United States imports of rubber scrap were 16,371,573 pounds, value \$1,271,903, compared with 11,006,928 pounds, value \$726,914, for 1915; 25,958,261 pounds, value \$2,063,198, for 1914. Exports of rubber scrap for the same period were 4,561,177 pounds, value \$424,650, for 1916; 2,422,091 pounds, value \$291,421, for 1915; 6,207,678 pounds, value \$598,287, for 1914.

London imports of waste and reclaimed rubber during August were 132,700 pounds; for Liverpool, 115,600 pounds. London exported during the same period 586,400 pounds; Liverpool, 479,600 pounds.

NEW YORK QUOTATIONS FOR CARLOAD LOTS DELIVERED

SEPTEMBER 27, 1916.

Prices subject to change without notice.

	Per Pound.
Boots and shoes	\$0.09¼ @
Trimmed arctics .....	.07 7/8 @
White tires, Goodrich and Goodyear .....	.08¼ @
Auto tires, standard white .....	.06 1/8 @
standard mixed .....	.06 1/8 @
stripped, unguaranteed .....	.09 1/2 @
Auto peelings, No. 1 .....	.08 1/2 @
No. 2 .....	.25 1/2 @
Inner tubes, No. 1 .....	.11 1/4 @
No. 2 .....	.11 1/4 @
Irony tires .....	.02 8 @
Bicycle tires .....	.04 1/4 @
Solid tires .....	.05 3/8 @
White scrap, No. 1 .....	.13 1/2 @
No. 2 .....	.10 @
Red scrap, No. 1 .....	.10 @
No. 2 .....	.08 @
Mixed black scrap, No. 1 .....	.04 @
No. 2 .....	.03 1/4 @
Rubber car springs .....	.04 @
Horse shoe pads .....	.04 @
Matting and packings .....	.01 @
Garden hose .....	.01 1/2 @
Air brake hose .....	.05 1/4 @
Cotton fire hose .....	.02 1/2 @
Large hose .....	.01 1/2 @
Hard rubber scrap, No. 1, bright fracture .....	.25 @
Battery jars (black compound) .....	.02 1/2 @ .02 3/4
Insulated wire stripping .....	.03 @ .03 1/4
Rubber heels .....	.03 1/2 @ .03 3/4

THE MARKET FOR COTTON AND OTHER FABRICS.

Copyright, 1916.

NEW YORK.

ANOTHER extraordinary jump in raw cotton followed the sensational advance of a month ago and January contracts were forced up to 16.42. The gloomy crop report and active buying in the South are the reasons attributed to this movement. During the month the market weakened under heavy selling pressure, but a renewal of general bull support carried January deliveries up to 16.30 on September 20, or within 18 points of the high record of September 1. The rumors of heavy buying for British account have not been confirmed. The opinion is current that 20-cent cotton will be a fact before many months.

R. Lamour Neill, a statistician of reputation, estimates this year's crop at 13,000,000 bales, exclusive of linters, or about 14,000,000 bales including linters.

SEA ISLAND COTTON. An active demand marked the opening of the southern markets that have been closed since August 1. Prices were irregular and the tone of the market sensitive. Fancy Georgias and Floridas were selling at 31@32 cents in Savannah September 8. Prices advanced strongly during the month and on September 22, Fancy Georgias and Floridas were selling in an excited market at 34@35 cents. The advance in Egyptians and the small amount offered will doubtless result in heavy demands and higher prices for Sea Islands. Crop reports from the Islands are not promising, while the Georgia and Florida crop on the whole is favorable.

EGYPTIAN COTTON. The continued rise in the American markets and unfavorable crop reports have been followed by a firm market and advancing prices, F. G. F. Sakelarides being quoted at 34 on August 25. The present is the most critical period for the Egyptian crop which, generally speaking, is not as favorable as two weeks ago. However, a definite forecast would be premature at this time.

HOSE AND BELTING DUCK. Foreign business has been easier this month and the domestic demand for mechanical duck has been about normal. The extraordinary call for all other rubber fabrics will doubtless result in a scarcity of hose and belting duck. Moreover, a government order for 2,000,000 yards of army, sail and wide duck will be placed early this month. This will require considerable loom capacity and result in a shortage elsewhere. The rubber trade is well covered for the first six months of 1917 and hose and belting contracts are being written for deliveries during the last half of next year.

SHEETINGS, DRILLS AND ENAMELING DUCK. The market is firm, and price advances have been recorded in the entire list during the month. Wide grades are prominent in the demand, which is absorbing the capacity of the mills. Rubberized sheeting with imitation leather finish for auto tops is being substituted for cotton mohair.

TIRE FABRICS. The demand is very great and the mills are sold up to capacity. The advancing prices of raw material and inability of the manufacturers to secure the necessary labor and new loom equipment have advanced prices and prolonged contract deliveries of tire fabrics to July, 1917. While it is generally conceded that the large consumers are covered, there are indications of a shortage in tire building fabrics.

NEW YORK QUOTATIONS.

SEPTEMBER 30, 1916.

Prices subject to change without notice.

Aeroplane and Balloon Fabrics:

Wamsutta, S. A. 1, L. No. 1, 40 inch	yard	\$0.30	a
O. N. E. No. 4, 38½ inch	yard	.13½	a

Wool Stockinettes—52-inch:

A—14 ounce	yard	1.25	a
B—14 ounce	yard	1.50	a
C—14 ounce	yard	1.75	a

Cotton Stockinettes—52-inch:

D—14 ounce	yard	.50	a
E—11½ ounce	yard	.42	@ .50
F—14 ounce	yard	.55	a
G—8 ounce	yard	.48	@ .50
H—11 ounce	yard	.50	@ .55
I—9 ounce	yard	.4	@ .45

Colors—white, black, blue, brown.

Tire Fabrics:

17½ ounce Sea Island, combed	square yard	.90	a
17½ ounce Egyptian, combed	square yard	.75	a
17½ ounce Egyptian, carded	square yard	.72	a
17½ ounce Peellers, carded	square yard	.52	@

Sheeting:

40 inch 2.35-yard	yard	.11	a
40 inch 2.50-yard	yard	.10½	@
40 inch 2.70-yard	yard	.10	@
40 inch 2.85-yard	yard	.09½	a
40 inch 3.15-yard	yard	.09	a

Osnaburgs:

40-inch 2.25-yard	yard	.13	@
40-inch 2.48-yard	yard	.11½	@
37½-in. 2.42-yard	yard	.12	@

Mechanical Ducks:

Hose	pound	.30	a
Belting	pound	.30	a

Carriage Cloth Duck:

38-inch 2.00-yard enameling duck	yard	.15	@
38-inch 1.74-yard	yard	.17	a
72-inch 16.66-ounce	yard	.35	a
72-inch 17.21-ounce	yard	.36	@

Drills:

38-inch 2.60-yard	yard	.15	a
40-inch 2.47-yard	yard	.11	@
52-inch 1.90-yard	yard	.16	@
52-inch 1.95-yard	yard	.15½	@
60-inch 1.52-yard	yard	.21	@

Yarns:

Garden Hose, 12/2 cabled	pound	Nominal	
Fire Hose 12/1	pound	Nominal	

Imported Woollen Fabrics Specially Prepared for Rubberizing—Plain and Fancies:

63-inch, 3¼ to 7½ ounces	square yard	.38	@ 1.55
36-inch, 2¼ to 5 ounces	square yard	.35	@ .85

Imported Plaid Lining (Union and Cotton):

63-inch, 2 to 4 ounces	square yard	.35	@ .75
36-inch, 2 to 4 ounces	square yard	.20	@ .45

Domestic Worsted Fabrics:

36-inch, 4¼ to 8 ounces	square yard	.27½	@ .50
Domestic Woven Plain Linings (Cotton):			
36-inch, 3¼ to 5 ounces	square yard	.15½	@ .20

Raincoat Cloth (Cotton):

Bombazine	yard	.07½	a
Twills	yard	1.2	@ .18
Tweed	yard	.20	@ .35
Tweed, printed	yard	.07½	@ .15
Plaid	yard	.08	@ .10
Repp	yard	.18½	@ .25

Burlaps:

32-71-ounce	100 yards	6.30	a
40-7½-ounce	100 yards	6.90	a
40-8-ounce	100 yards	7.00	a
40-10-ounce	100 yards	8.35	a
40-10½-ounce	100 yards	8.50	a
45-7½-ounce	100 yards	7.80	a
45-8-ounce	100 yards	7.90	a
48-10-ounce	100 yards	11.50	@

SEA ISLAND COTTON STATISTICS, 1910-1916.*

SEA ISLAND CROP 1915-1916.

	Receipts 1915-1916.	Receipts 1914-1915.
Stock at End, August 1	2,438	4,799
Received at Savannah (net)	38,216	33,052
Received at Charleston	6,211	5,488
Received at Jacksonville	30,367	27,258
Received at Norfolk (no figures obtainable)		2,123
Received at interior points and shipped to southern mills	11,018	11,194
Total visible supply for season	88,194	82,844
Less Total Exports	85,686	80,462
Stock, July 31, 1916—Savannah, 2,401; Charleston, 107...	2,508	2,382
Commercial crop for season 1915-16	85,812	78,857
Crop grown for season 1915-16	91,920	81,598

EXPORTS AND RESHIPMENTS 1915-1916.

	Great Britain.	Continent.	Northern Mills.	Southern Mills.	Savannah.	Total.
From Savannah	1,122	1,060	6,64	9,640		38,463
From Charleston	545		3,814	1,039	876	6,274
From Jacksonville			30,367			30,367
From Norfolk (no figures obtainable)						
From interior points				11,018		11,018
	1,667	1,060	60,822	21,697	876	86,122
Less cotton counted twice					436	436
	1,667	1,060	60,822	21,697	440	85,686

COMPARATIVE STATEMENT OF EXPORTS FOR PAST SIX YEARS.

	1910-1911.	1911-1912.	1912-1913.	1913-1914.	1914-1915.	1915-1916.
Great Britain	1,134	1,068	10,914	11,749	1,922	1,667
Continent	5,808	6,615	5,161	4,833	1,991	1,060
Domestic, northern mills	56,896	92,679	29,451	67,636	60,879	60,822
Domestic, southern mills	7,952	9,029	10,492	14,427	15,409	21,697
	84,002	122,008	56,018	98,645	80,201	85,246

COMPARATIVE STATEMENT OF CROP GROWN FOR PAST SIX YEARS.

	1910-1911.	1911-1912.	1912-1913.	1913-1914.	1914-1915.	1915-1916.
South Carolina	13,784	5,122	8,375	8,670	5,590	6,178
Georgia and Florida	76,584	118,196	65,266	68,820	76,008	85,742
	90,368	123,312	73,641	77,490	81,598	91,920

*Compiled by John Malloch & Co., Savannah, Georgia.

THE MARKET FOR CHEMICALS AND OTHER INGREDIENTS.

Copyright 1916.

NEW YORK.

THE rubber chemical market for the past month has developed no unusual features worthy of special record. Generally speaking, the situation has been dull and prices have declined, with but few exceptions in the list. This was expected as a natural result of the high prices prevailing during the past year and their return to normal levels. Toward the end of September, trade was better in certain quarters, both foreign and domestic; inquiries had increased and, in consequence, prices were a shade firmer. These are signs of returning business activity that is confidently expected to be fully realized by November.

BARYTES. The trade continues to take goodly amounts of barytes, and the demand keeps pace with the production, which is constantly increasing. Prices are firm and somewhat lower than a month ago.

LITHARGE. Contract deliveries of litharge have been freely made to the mills during the month. Producers report being well sold ahead for some time. There is a good demand and considerable inquiry for export. Prices are firm and unchanged.

LITHOPONE. Both foreign and domestic lithopone have gradually declined during the month. There was considerable movement of this material against old contracts placed some time ago at different prices. Spot stocks are not plenti-

tul and some sellers are having difficulty in making deliveries.

ZINC OXIDE. The decline in spelter resulted in lower prices, effective October 1, on French process grades, covering deliveries over the last quarter of the year. There was no change in American process grades.

DRY COLORS. Prices in general have gradually declined. Ultramarine blues and reds, however, have not changed much and are still scarce, while the imported grades are unobtainable. Red oxide is scarce and prices firm.

NAPHTHA. All the grades, used in the trade have declined a cent since last month.

THE MARKET FOR CHEMICALS AND COMPOUNDING INGREDIENTS.

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NEW YORK QUOTATIONS.

SEPTEMBER 28, 1916.

Subject to change without notice.

Acetone (drums)	10.00	a
Acid, acetic, 28 per cent. (bbls.)	14	a .015
cresylic (crude)	80	a
glacial, 99 per cent. (carboys)	27	a .28
muriatic, 20 degrees	0.1	a .12
nitric, 36 degrees	36	a .36
sulphuric, 60 degrees	.01	@
Alumina Pigment, No. 1 (sacks)	16.00	a
Aluminum Flake (carloads)	30.00	a .20
Ammonium carbonate	.11	a .11
Antimony, crimson, sulphuret of (casks)	.35	@ .50
crimson, "Mephisto" (casks)	.60	a
golden, sulphuret of (casks)	.25	@ .35
golden, "Mephisto"	.29	@
golden, sulphuret, States brand, 16-17 per cent.	.40	@
Asbestine	16.00	a .000
Asbestos	15	a .35.00
Asphaltum "G" Brilliant	.12	a .03
Barium sulphate, precipitated	150.00	@
Barytes, pure white	30.00	@ .35.00
off color	25.00	a .33.00
Basofor	15.00	a
Benzol, pure	70	a .75
Beta-Naphthol	1.10	a .1.5
Black Hypo	.45	@ .75
Bone ash		None
black	.04	@ .08
Cadmium tri-sulphate (f. o. b. London)	2.75	@
sulphide yellow	.10	a .10
Cantella gum	10.00	a .20.00
Carbon, bisulphide (drums)	.06½	@ .07
black (cases)	.18	@ .20
tetrachloride (drums)	.19	@ .20
Caustic soda, 76 per cent.	.04½	@
Chalk, precipitated, extra light	.04½	@ .05½
precipitated, heavy	.04	@ .05
China clay, domestic	.12	@ .15
imported	.18	@ .38
Chrome, green (pure)	.40	a .65
yellow	.28	@
Coal tar	4.50	a
Corn oil, refined	10.25	@
Cotton linters	.06½	@
Fossil flour	.01½	@ .03
Gas black	.14	@ .10
Gelotite	.10	a .03
Glycerine, C. P. (drums)	.42½	@
Graphite, flake (400 pound bbl.)	.20	@
powdered (400 pound bbl.)	.07	@
Green oxide of chromium (casks)	.75	@
Ground glass (fine)	.02½	@
Indian red, reduced grades	.04	a .05
pure	.08	a .08
Infusorial earth, powdered	50.00	@ 60.00
bolted	60.00	@ 65.00
Iron oxide, red, reduced grades	.03½	@ .04
red, pure, bright	.11	a .1
Ivory, black	.16	a .30
Lampblack	.04	a
Lead, red oxide of	.09¾	@
sublimed blue	.05¾	@

white, basic carbonate	ib.	.08¾ @
white, basic sulphate	ib.	.08¾ @
Litharge	ib.	.08¼ @ .10
English	ib.	.002 a .1
sublimed	ib.	.002 a .1
Lithopone, domestic	ib.	.08 @
Imported	ib.	Nominal
Magnesite, carbonate	ib.	.00 a .05
colored, heavy	ib.	.00 a .05
heavy, Thistle Brand	ib.	.30 a
light	ib.	.03 a .05
Magnesite, alumina, powdered	ton	.00 a .00
Mica, powdered	ib.	.03 a .05
Mineral rubber	ib.	.01 @ .02
"M. R. X."	ton	100.00 @
"Gemaco"	ton	36.50 @
"L. M. R."	ton	50.00 @
"Richmond Brand"	ib.	.03 a
"N. 64 Brand"	ton	3 @ .05
Naphtha, stove gasoline (steel bbls.)	gal.	.22 @
68@70 degrees (steel bbls.)	gal.	.28 @
A. M. S. I. (steel bbls.)	ib.	.41 a
Oil, amline	ib.	.40 a
linseed (bbl.)	ib.	.75 a
palm	gal.	.13½ @ .14
paraffin	gal.	.17 @
rapeseed	gal.	1.60 @ .05
resin, heavy body	gal.	.38 @
tar (cases)	ib.	.14 a
soluble aniline colors, yellow, orange, red, violet, blue, green	ib.	.10 @ .75
Orange mineral, domestic	ib.	.12 @
Paragol (carloads)	cwt.	8.26 @
Petrolatum	ib.	.03½ @ .04
Petroleum grease	ib.	.03½ @
Pine solvent	ib.	.03½ @
Pine tar	ib.	None
Pitch, burgundy	bbl.	7.50 @
pine	ib.	.03 a .04
Plaster of paris	ib.	.02 @
Prussian blue	ib.	1.50 @ 1.70
Pumice stone, powdered (bbls.)	ib.	1.25 @
Resin, Pontianak, refined	ib.	.03 @ .04
granulated	ib.	.23 @
fixed	ib.	.15 @
Rosin (280 pound bbls.)	bbl.	4.50 @ 7.70
Rotten stone, powdered	ib.	.02½ @ .04
Rubber black	ib.	.06 @
Rubber substitute, black	ib.	.08½ @ .10
white	ib.	.12 @ .17
brown	ib.	.12 @ .17
Rubblite	ib.	Nominal
Shellac, fine orange	ib.	.38 @ .30
Soapstone, powdered	ton	10.00 @ 22.50
Starch, corn, powdered	ib.	.02¼ @ .02½
Sulphur chloride (drums)	ib.	.09 @ .09½
Sulphur, flour, velvet, Brooklyn brand (carloads)	cwt.	.05 @
Talc, American	ton	8.00 @ 17.50
French	ton	15.00 @ 22.50
Toluol, pure	gal.	3.50 a
Turpentine, pure gum spirits	ton	50.00 @ 60.00
wood	gal.	.44 @ .46
Venice	gal.	.13 @
Ultramarine blue	ib.	.11 @ .12
Vermilion, brilliant	ib.	.15 @ .50
Chinese	ib.	1.00 @ 1.25
English	ib.	.95 @ 1.00
Wax, beeswax, white	ib.	1.50 @ 1.60
ceresin, white	ib.	.40 @ .50
carnauba	ib.	.11 @ .20
ozokerite, black	ib.	.25 @ .45
green	ib.	.60 @ .65
montan	ib.	.70 @ .75
118/120 m. p. (cases)	ib.	.27 @ .28
123/125 m. p. (cases)	ib.	.07 @
128/130 m. p. (cases)	ib.	.08 @
133/136 m. p. (cases)	ib.	.09½ @ .12
crude, white, 117/119 m. p. (bbls.)	ib.	.05 @
yellow, 124/126 m. p. (bbls.)	ib.	.05½ @
Whiting, Alha	cwt.	.60 @ .70
commercial	cwt.	.75 @ 1.00
gilders	cwt.	.85 @ 1.00
Paris, white, American	cwt.	.95 @ 1.00
English cliffstone	cwt.	1.25 @ 1.50
Wood pulp XXX (carloads)	ton	Nominal
Yellow ochre (Satin)	ib.	.02½ @
India rubber	ib.	1.50 @
Zinc oxide, American process, horsehead brand	ib.	.10½ @
"XX red"	ib.	.16 @
French process, green seal, f. o. b. factory	ib.	.12½ @
red seal, f. o. b. factory	ib.	.12½ @
white seal, f. o. b. factory	ib.	.13½ @
Zinc sulphide, pure	ib.	.15 @



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FIRE AND ACCIDENT PREVENTION DAY.

To eliminate common fire and accident hazards from the United States and Canada the National Fire Protection Association and the National Safety Council are urging the nationwide observance of Fire and Accident Prevention Day on October 9, the anniversary of the great Chicago fire. An attractive poster has been designed, and suggested programs for observance of the day worked out, which are being distributed to the civic and commercial organizations of the country. The national and Dominion associations of fire chiefs, fire marshals and credit men are coöperating. While sporadic observances of fire prevention day have heretofore been held in certain states and cities, this is the first organized attempt to promote its general observance throughout this nation and the Dominion.

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Vol. LV. No. 2.

NOVEMBER 1, 1916

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Published on the 1st of each month by

THE INDIA RUBBER PUBLISHING CO.

No. 25 West 45th Street, New York.

Telephone—Bryant 2876.

CABLE ADDRESS: IRWORLD, NEW YORK.

HENRY C. PEARSON, Editor

Vol. 55 NOVEMBER 1, 1916 No. 2

SUBSCRIPTIONS: \$3.00 per year, \$1.75 for six months, postpaid, for the United States and dependencies and Mexico. To the Dominion of Canada and all other countries, \$3.50 (or equivalent funds) per year, postpaid.

ADVERTISING: Rates will be made known on application.

REMITTANCES: Should always be made by bank draft or Postoffice or Express money order on New York, payable to THE INDIA RUBBER PUBLISHING COMPANY. Remittances for foreign subscriptions should be sent by International Postal Order, payable as above.

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TABLE OF CONTENTS ON LAST PAGE OF READING.**"VULCANIZATION WITHOUT SULPHUR."**

FROM its inception the world's rubber industry has depended upon sulphur to effect vulcanization. Nor has there been a substitute discovered or invented. Possibly none is now in sight, but the exceedingly interesting experiments conducted by the eminent Russian chemist, Professor I. I. Ostromyslenski, lead one to think otherwise.

The details of the learned professor's experiments and conclusions, although published in the "Journal of the Russian Physico-Chemical Society," were not available to the English-speaking world. Appreciating this, and alive to the widespread interest on the part of the chemist and rubber manufacturer in such a subject, the "India Rubber Journal" secured an eminent linguist to translate the three papers. This translation they published in full in their issue of September 30. THE INDIA RUBBER WORLD republishes the papers in this issue, and on its own behalf and that of its readers takes this occasion to thank

our British contemporary for rendering available this most original and valuable contribution to the literature of india rubber.

CHEAPER SOLVENT NAPHTHA THROUGH ALCOHOL.

WE HAVE but lately called attention to the importance of solvent naphtha in the rubber industry, the enormous quantities consumed, and the significance of the prevailing high cost. Since then, the price of gasoline has been reduced three cents a gallon, but the present 25-cent rate is still virtually double the price of a year ago, so that the matter today is no less vital to proofers and cement makers.

Governmental investigation and new cracking processes may obviate any new price increases for a time, but it is doubtful if they can bring about any very great further reductions. Of course, continued high prices would eventually encourage the production of gasoline from natural gas and also from shales, but such departures take time.

The wider use of industrial alcohol, which has become a certainty of the immediate future, presents the most promising solution of this vital problem. Dr. Arthur D. Little, the eminent chemist, is authority for the statement that there is no longer any question of the manufacture of alcohol on a commercial scale as a fuel for automobiles. Experiments have shown, he claims, that alcohol can be made for 25 cents a gallon, at which price it would be preferable to gasoline. It is cleaner; will not catch fire nor explode; will develop almost as much horse-power as gasoline, and the combustion products are negligible.

According to the Du Pont Laboratory, the production of alcohol from sawdust treated with sulphuric acid in a lined converter and subjected to heat and pressure, has already proved a commercial success. Another process to utilize the fermentable sugars existing in waste sulphite liquors at pulp mills has great future promise. It has been estimated that the proportion of alcohol present is about 1½ per cent, and that enough sulphite liquor now goes to waste to yield an output of 200,000 gallons of alcohol a day. Pure alcohol can be obtained in this way, but other compounds are usually present. Although the process has not in every instance proved successful, due to the high cost of the labor involved, this condition can probably be overcome. Still another important source of alcohol for commercial purposes is suggested by the fact

that about one-seventh of the world's total sugar production annually goes to waste.

The progress and future outlook of industrial alcohol means much to rubber manufacturers in almost every line, for its use in motors will insure cheaper solvent naphtha; indeed, in this respect, will outclass any opening of new petroleum fields or discovery of new cracking processes. It is also predicted that cheap alcohol may make possible the production of synthetic rubber at less than 25 cents a pound—the approximate cost of plantation rubber—a circumstance which, in turn, suggests employing petroleum bases for the same purpose should the market for one of the most profitable petroleum products, gasoline, be lost to alcohol.

THE PERIL OF PEACE.

DEPENDENT as American rubber manufacturers are upon Europe for crude rubber, they face the ever-present possibility of a sudden interruption of the supply. This might take the form of an embargo, because of international or trade differences, or of a virtual blockade of the ports receiving rubber. So far, the trade has been remarkably fortunate. While the war continues it is probable that the same favorable conditions will prevail; but what are the rubber prospects once peace is declared? That economic conditions will be vastly changed cannot be doubted for an instant. The enormous costs of the greatest and most terrible of all wars are certain not only to entail economies, but to create tariffs that will be great in proportion to the needs of the various belligerent countries.

It looks more and more as if free-trade England is turning definitely toward high tariff. Certainly, once her need of foreign-made goods becomes less imperative she is bound to protect home manufacturers, not alone in England proper, but in the great British colonies as well.

Nor is it supposable that with the crude rubber business in her own hands she will long omit to impose an export tax sufficient to be of material assistance in liquidating her immense war debt. Holland, too, has suffered great financial losses through the war, and an export tax on india rubber assessed by English colonies would doubtless be imitated by the colonies of the Netherlands.

Of course, this would stimulate rubber planting and do much for wild rubber besides; but prices would go up and stay up on all grades. It is probable that nothing will be done by America to counteract this tendency. Certainly, our government will not, perhaps cannot, come to the

rescue of the trade as England or Germany would under like conditions. It will be recalled, for instance, that America once held the rest of the world in leash with her practical monopoly of cotton growing. To offset it England produced not only Egyptian, but Indian and West Indian cotton. And in this she was wise and right.

American investments in rubber plantations of the Far East, already large, will doubtless have a mitigating influence. What would be far more potent, however, would be American plantations in American territory; not to drive the Far Eastern planter from the field, for he deserves his success and should be protected, but just to keep us from being so wholly, so helplessly dependent.

PENALTY DUTY ON INDIA RUBBER?

THE rubber trade received a disagreeable jolt a day or two ago when the New York "Herald" bureau at Washington outlined the provisions of a recently enacted tariff law. It was a bit of "eleventh hour" work and intended to protect the American dye manufacturers from German competition. As such it contained a provision for "penalty duties on articles imported into the United States under the agreements affecting the purchase of other goods by the importer." According to the "Herald" it is found that the provision "requires the imposition of penalty duties on all dutiable raw materials controlled by the Allies and sold to Americans under restrictions preventing export, etc."

India rubber is purchased under such restrictions and would seem to be subject to penalty duty. At the same time, however, comes the comforting assurance that it was all "a mistake" and that "No concealment was made of the intention to find some way of avoiding the enforcement of the law if that be possible."

OCOTILLO (ALSO KNOWN AS OCOTOLLO AND OCOTELLO) RUBBER, which has set Arizona ablaze, may or may not prove of use in general rubber manufacture. It may go the way of rabbit weed rubber and the seaweed rubber, but even in failure, if failure come, it will point a moral. And that is the wonderful market for American grown rubber or rubber-like gums, a market that will be supplied some way, some day.

ONE OF THE BRIGHT PUBLICITY MEN OF THE GOODYEAR TIRE & RUBBER Co. has spread broadcast, through the daily press, a tale to the effect that the Mexican peons use cast-off Goodyear tires for shoes. It may be true, nor is it for us to doubt it, but is this not a direct infringement? Has not the Goodrich company copyrighted "Barefoot" tires? Or do the peons also wear inner tubes for stockings?

Mechanism of the Process of Vulcanization of Caoutchoucs.

By I. I. Ostromyslenski.

[From the "Journal of the Russian Physico-Chemical Society," 1915, pages 1,453-1,461. Translated from the original Russian by Thomas H. Pope, B.Sc. Translation revised by Dr. H. P. Stevens, published in the "India Rubber Journal," September 30, 1916.]

THE hot vulcanization of caoutchouc discovered by Goodyear (1839) proceeds, as is well known, under simple conditions; a homogeneous mixture of the caoutchouc and sulphur is heated at 130 to 145 degrees. That is all. As a result, the initial caoutchouc loses its plasticity, and separate pieces of fresh fractures no longer exhibit the power of adhesion. The solubility is lowered, and the "interval of elasticity" increased; the fatal temperature of well vulcanized natural caoutchouc lies at about — 35 degrees, that of the chemically pure product being about — 18 degrees. What takes place during the heating of the caoutchouc? Attempts to explain this peculiar process have exhausted all the theoretical possibilities. Some investigators regard it as an exclusively physical process, and others as solely a chemical reaction, whilst many authors consider vulcanization to be determined by both physical and chemical changes.

Since all phenomena, at any rate, of unorganized nature, are divided into only two groups—the physical and the chemical—there can be no essentially new theory of vulcanization. Nevertheless, the nature of the mechanism of the process even yet remains unexplained.

The supporters of Weber's chemical theory regard vulcanized solid caoutchouc (ebonite) as a polymeride of the compound, $C_{10}H_{16}S_2$ (16 per cent of sulphur), whilst others, for instance, Erdmann, consider it to be the thiozoide, $C_{10}H_{16}S_3$, or even a dithiozonide. On the other hand, many identify the vulcanization of caoutchouc with the process of "swelling" (Quellung) of colloids or that of gelatinization or adsorption, that is, with the processes of formation of solid or "semi-solid" solutions, etc.

Some of the supporters of the "mixed" theory consider that the sulphur itself swells or is adsorbed or dissolved in the free caoutchouc, whereas other authors assume the preliminary formation of a compound of the caoutchouc with the sulphur—although only in insignificant amount—this compound being then adsorbed in the still unchanged caoutchouc.

I shall not devote time to the extensive literature of this question, but shall proceed immediately to the conclusions which result from my observations and my new methods for vulcanizing caoutchouc.

Until now no method of vulcanizing caoutchouc has been known in which any organic or mineral compound not containing sulphur is used as vulcanizing agent.* But the chemical and especially the physical theories of vulcanization anticipate the possible existence of a whole series of such compounds. I decided to attempt to find substances which may replace sulphur in the vulcanization of caoutchouc.

It was thought that the investigation of the action of homologues and analogues of such substances on caoutchouc and that of the external conditions of the new process—the influence of different admixtures, accelerators, etc.—might elucidate the mechanism of vulcanization itself.

This task has now been completed, and two new methods for the hot vulcanization of caoutchouc have been discovered.

When heated with unsaturated hydrocarbons, sulphur produces a twofold effect: it combines at the double bond with formation of thiozonides (Erdmann), or it oxidizes the ethylene grouping, removing hydrogen in the form of hydrogen sulphide, a new

ethylenic derivative, or a new compound containing sulphur being thus formed.*

On the physical side, sulphur is characterized, besides by the ordinary constants (specific gravity, melting point, etc.), and by its ability to exist in different polymorphic modifications (rhom-bic, hexagonal, amorphous, etc.).

In searching for organic substances which vulcanize caoutchouc like sulphur, the first to be investigated are those which resemble sulphur in oxidizing ethylenes, and at the same time are able to unite at the double linking. Of the physical constants of such substances the essential ones are the melting point and the vapor pressure at the temperature of vulcanization; after these, the solubility in caoutchouc, specific gravity, etc. Besides possessing physical constants near to those of sulphur, the sought for compounds should exist in polymorphic modifications.

This explains why, in this investigation, I first of all made a halt at compounds containing the nitro-group. These oxidize organic substances (c. g., in Skarup's synthesis of quinoline), and at the same time readily combine with various ethylenes (attention may be called to the compounds of Ar (NO_2) with polycyclic hydrocarbons and to the author's use of tetranitromethane as a reagent for double bonds).

1:3:5-Trinitrobenzene has a melting point, 118 degrees, very near to that of sulphur, i.e., below the temperature of vulcanization, and in specific gravity it also resembles sulphur. Further, most polynitro-compounds exist in polymorphic modifications.

1:3:5-Trinitrobenzene was the first instance which I hoped would serve as a substitute for sulphur in vulcanization. Experiment completely confirmed my expectation. It was found that both synthetic and natural caoutchoucs are vulcanized more rapidly and easily by various nitro-compounds than by sulphur itself under the same conditions. The result was a product possessing all the associated physical properties of caoutchouc vulcanized by means of sulphur. Experiments were made with both fatty and aromatic nitro-compounds, and vulcanization took place with nitrobenzene, dinitrobenzenes, trinitrobenzenes, tri- and tetra-nitronaphthalenes, picric acid, picramic acid, picryl chloride, "artificial musk," nitro-cyclohexane, and many other compounds.

Further investigation showed that the vulcanizing properties of nitro-compounds do not depend on their capacity for combining at the double linking. As is well known, picric acid combines with ethylenic compounds considerably more readily than most other nitro-compounds of the aromatic series, and yields more stable products. Next in order come picryl chloride, picramic acid, trinitrobenzene, etc.; dinitro- and mononitro-benzenes do not unite at all with ethylenic derivatives.

On the other hand, according to their vulcanizing power, nitro-compounds are arranged in the reverse order, or, more accurately, in an order which reveals no analogy between the processes of vulcanization and of combination at the double linking.

Caoutchouc is vulcanized most rapidly and easily by 1:3:5-trinitrobenzene, after which come dinitrobenzene, mononitrobenzene, tetranitronaphthalene. Picric acid and picryl chloride do not yield satisfactory products; vulcanization undoubtedly begins, but, in spite of many series of experiments, I have never succeeded in bringing it to completion; the caoutchouc partially retains its plasticity, and sticks when fresh fractures are pressed together.

*The process of vulcanization is often termed the sulphuring of caoutchouc. Vulcanization by calcium or sodium hypochlorite or free hypochlorous acid, like vulcanization by halogens (bromine, iodine, or iodine bromide), leads, as is known, only to "horny" rubber, i.e., to ebonite-like substances. Compare Marckwald and Frank, "Über Herkommen und Chemie des Kautschuks," Dresden, page 62.

*When acenaphthere is heated with sulphur, the hydrocarbon $C_{18}H_{14}$ (deca-cyclene) is formed.

Methanetriphenylmethane gives completely satisfactory results.*

The combining capacity of nitro-compounds increases with the number of nitro-groups in the molecule, but we are convinced that the vulcanizing power of nitro-compounds does not depend on this cause. Ostromyslenski found that tetranitromethane unites with ethylenic compounds of both the aromatic and aliphatic series, but in no case has it been possible to vulcanize caoutchouc with tetranitromethane, although a large number of attempts have been made.

Various other substances which, like nitro-compounds, are able to unite with ethylenic derivatives, have also been tried, among them triphenylmethane and diaminotriphenylmethane. These compounds, in perfect agreement with the above results, cause no trace of vulcanization, the caoutchouc remaining sticky and plastic, and retaining even its pale color.† These facts show that the power of nitro-compounds to vulcanize caoutchouc is not determined by their ability to combine with ethylenes.

Is any rôle in the vulcanization played by the capacity of nitro-compounds to oxidize organic substances—by their property of yielding active oxygen with formation of nitroso-compounds? In other words, does the vulcanizing action of nitro-compounds depend on the combination of active oxygen at the double linking of the caoutchouc? This question must, as experiment shows, be undoubtedly answered in the affirmative. First of all, nitroso- and isonitroso-compounds do not vulcanize, as is shown by experiments with nitrosobenzene and isonitrosocamphor under various conditions. This result leads to the assumption that the vulcanizing power of nitro-compounds belongs to one of the oxygen atoms of the NO_2 radicle. It follows, therefore, that under suitable conditions caoutchouc should be vulcanized by ozone or ozonides, or by various peroxides, per-acids, etc.

This fundamental conclusion has been confirmed by direct experiment, a second new method having been found for the hot vulcanization of caoutchouc by compounds containing active oxygen. Special attention has been paid to the vulcanization of natural and synthetic caoutchoucs with benzoyl peroxide and perbenzoic acid. It is found that caoutchouc is vulcanized by benzoyl peroxide incomparably more rapidly and easily than by sulphur or even nitro-compounds.

In order to confirm the deciding part played by the oxygen atom, attempts were made to vulcanize caoutchouc with barium peroxide. This substance yields its oxygen with moderate rapidity only at very high temperatures, and should not effect vulcanization‡ if the latter is determined by the combination of oxygen at the double linking of the caoutchouc. Actual experiment gives the results expected, since barium peroxide produces no trace of vulcanization.

These new methods of vulcanizing caoutchouc, and the favorable results obtained, are of undoubted scientific and practical interest, and in the first place throw new light on the puzzling mechanism of this process.

We are convinced that the present day vulcanization of caoutchouc begins with a chemical process. Only certain classes of substances—sulphur and some of its derivatives (S_2 , Cl_2 , Ca S_2 , etc.), nitro-compounds, peroxides and per-acids—bring about vulcanization. The physical constants and peculiarities of the vulcanizing substance are without influence on the final effect. What can there be common to the physical properties of gaseous oxygen, sulphur, tetranitronaphthalene and perbenzoic acid? At the same time it is sufficient to replace the oxygen of dinitrotriphenyl-

methane by hydrogen or to remove from the nitro-group of nitrobenzene one atom of oxygen, to obtain a compound—diaminotriphenylmethane, nitrosobenzene—absolutely devoid of the power to vulcanize caoutchouc.

In the process of vulcanization, chemical reactions are allotted, therefore, a definite but still quite modest place. Chemical action with the vulcanizing compound occurs with only a negligible fraction of the initial caoutchouc. Thus, it is found that the complete vulcanization of 100 parts of natural Para caoutchouc requires only 0.5 parts of nitrobenzene or 1:3:5-trinitrobenzene.

There can be no question here of molecular proportions, since 100 parts of $\text{C}_{10}\text{H}_{10}$ would correspond with a minimum of 156 parts of $\text{C}_6\text{H}_5(\text{NO}_2)_3$. Even if it is assumed that $\text{C}_{10}\text{H}_{10}$ requires only one atom of active oxygen—which is not true—and that the molecule of trinitrobenzene contains three atoms and that of nitrobenzene one atom of active oxygen, 100 parts of caoutchouc would require 52 parts of trinitrobenzene or 90 of nitrobenzene. Even the corresponding solid ebonite is, however, obtained by vulcanizing rubber in presence of 10-15 per cent. of trinitrobenzene.

Thus, with the actual methods for vulcanizing caoutchouc only a vanishing part of the latter enters into chemical reaction, but this reaction is actually indispensable. The further course of this interesting process is conditioned by physical interaction between the vanishing quantity of caoutchouc which has reacted and that which has remained unchanged.

Thus, we arrive at the conclusion that the vulcanization of caoutchouc is divided sharply into two fundamental phases: (1) A chemical reaction affecting only an insignificant part of the caoutchouc, and (2) adsorption or swelling of the unchanged caoutchouc into the product of this chemical reaction.

Vulcanization may, however, be imagined as an exclusively physical process, since theoretically it may begin with the second phase of the process. Thus, instead of bringing nitro-compound, sulphur, or peroxide into contact with caoutchouc, we may isolate and make use of the minute proportion of substance formed in our first phase; by heating this mixture we should undoubtedly obtain vulcanized caoutchouc. In such case vulcanization takes place in a single phase—adsorption or swelling of the initial caoutchouc into the mixed product, and represents an exclusively physical process typical of caoutchouc. In vulcanization by means of sulphur the existence of the latter in the free state is of no importance, as it is necessary only for the preliminary formation of its compound with caoutchouc, and then only in negligible amount.*

The elastic and other properties of caoutchouc vulcanized, for instance, by trinitrobenzene, are qualitatively and quantitatively identical with those of caoutchouc vulcanized with sulphur. Both substances are devoid of plasticity and stickiness and exhibit similar difficult solubility, etc.

Only by chemical analysis might these two vulcanizates be distinguished, although they are obtained by treatment of caoutchouc by absolutely different compounds. The nature of the vulcanizing substance, is, therefore, almost without influence on the physical properties, solubility and all the elastic properties of the resulting caoutchouc; it has, further, no effect on the chemical properties of the vulcanizate, since the latter contains only a negligible proportion of foreign substance.

It may again be emphasized that the characteristic changes in the properties of caoutchouc produced by vulcanization are determined exclusively by a physical process—the adsorption or “swelling” of the caoutchouc.

These new methods of vulcanization of caoutchouc open up a wide perspective, and it may be that the nitro-compounds, peroxides, and per-acids represent only the “first swallow” and that

* Slight adsorption of caoutchouc by nitrobenzene, as is well known, does not indicate that vulcanization is incomplete, especially with rubber which has been only recently vulcanized.—H. P. S.

† This again is not necessarily an indication that vulcanization has not taken place.—H. P. S.

‡ It has been already found that the melting point of the vulcanizing substance does not affect the process. Thus, caoutchouc is readily vulcanized by nitrobenzene, which is a liquid, and by tetranitronaphthalene, which melts at 218 degrees, whereas the vulcanization proceeds at 116-145 degrees.

* It may be that this compound vulcanizes caoutchouc only when in “statu nascendi.”

further work will reveal sooner or later other quite diverse substances capable of vulcanizing caoutchouc like sulphur.†

[SECOND PAPER.]

[From the "Journal of the Russian Physical-Chemical Society," 1915, pages 1,462-1,467. Abstract from "Journal of Society of Chemical Industry," Vol. XXXV, p. 59.]

Further investigation of this method of vulcanization shows that natural Para caoutchouc is completely vulcanized by as little as 0.5 per cent of trinitrobenzene, whereas 6 per cent of sulphur would be required. Further, in the latter case, the unavoidable presence of free, uncombined sulphur lowers the technical value of many rubber wares. The use of different organic compounds for vulcanization of caoutchouc allows of considerable variation in the physical properties, *e. g.*, flexibility, elasticity, etc., besides in the color, smell, etc. Vulcanization may be effected by mono-, di-, and trinitrobenzenes, -toluenes, etc., tri- and tetra-nitronaphthylamines, picramic acid, picryl chloride, artificial musk, nitro-cyclohexane, nitro-dyestuffs, etc. Metallic oxides, which facilitate the vulcanization of rubber by sulphur and enhance the value of the product obtained, exert a similar effect on vulcanization by nitro-derivatives; lead oxide is most valuable in this respect, and then follow, in order, oxides of zinc, calcium, magnesium, barium. On the other hand, mixtures of aliphatic amines with the above oxides, although they accelerate vulcanization by sulphur or

†It might be expected on theoretical grounds that caoutchouc would be vulcanized under suitable conditions by oxides of nitrogen, hydrogen peroxide, ozone, ozonides of the terpenes, oxygen or air in presence of compounds which activate oxygen, and many other substances.

lower the temperature of the process to 10 to 15 degrees C., retard vulcanization by nitro-compounds and lower the value of the corresponding product. Like sulphur and sulphur chloride, nitro-derivatives vulcanize, not only caoutchouc, but also various vegetable oils yielding products analogous to factice.

[THIRD PAPER.]

[From the "Journal of the Russian Physical-Chemical Society," 1915, pages 1,467-1,471. Translated from the original Russian by T. H. Pope, B.Sc.]

The vulcanization of caoutchouc by means of peroxides proceeds considerably more rapidly and at a lower temperature than vulcanization by means of sulphur or even nitro-compounds. The theoretical significance of this process has been already considered in earlier papers.

Vulcanization by the action of benzoyl peroxide has been investigated in detail. It is found: (1) That metallic oxides which accelerate the vulcanization of caoutchouc by means of sulphur or nitro-compounds—PbO, ZnO, MgO, CaO, etc.—are almost without effect on vulcanization by benzoyl peroxide; in some cases they diminish the velocity of the process, and in most instances increase the oxidizability, that is, the rate of decomposition, of the given vulcanizate. (2) Colophony and other resins lower the stability of caoutchouc on vulcanization by benzoyl peroxide. (3) Mixtures of amines and metallic oxides, which were found by the author to act as accelerants of the ordinary vulcanization of caoutchoucs by sulphur, retard vulcanization by the new method and decrease the stability of the corresponding vulcanizate. (4) Proteins exert a similar in-

TABLE A.—HOT VULCANIZATION BY NITRO-COMPOUNDS WITHOUT SULPHUR

Number of Experiment	Caoutchouc Used.	Grams of caoutchouc	Vulcanizing Substance	Grams of vulcanizing substance.	Grams of PbO	Foreign Substances Present.	Pressure and Steam in the Chambers of the Vulcanizing Press.	Time of vulcanization in minutes.	Remarks.
1	Para	100	1:3:5 C ₆ H ₃ (NO ₂) ₃	4	0		45 lbs.	45	Vulcanization complete.
2	Para	100	1:3:5-C ₆ H ₃ (NO ₂) ₃	4	0		45 lbs.	45	Somewhat over-vulcanized.
3	Para	100	1:3:5 C ₆ H ₃ (NO ₂) ₃	4	0		45 lbs.	20	Vulcanization incomplete.
4	Crêpe	10	Ortho C ₆ H ₄ (NO ₂) ₂	1	3		3 atmos.	45	Vulcanization complete; product smells of bitter almonds.
5	Crêpe	10	Ortho C ₆ H ₄ (NO ₂) ₂	1	3		3 atmos.	60 or 120	Product difficult to distinguish from No. 4.
6	Crêpe	10	Ortho C ₆ H ₄ (NO ₂) ₂	10	20	10 grams piperidine preparation No. 2	3 or 4 atmos.	5, 10, 45, 120	No vulcanization.
7	Peruvian	10	C ₆ H ₅ NO ₂	0.5	3		3 atmos.	120	Vulcanization complete; possesses smell of bitter almonds.
8	Peruvian	10	1:2:6:8-tetranitronaphthalene	1	3		3 atmos.	120	Vulcanization complete; the high m.p. 204° probably determines the slowness of the process in this case.
9	Crêpe	10	1:3:5 C ₆ H ₃ (NO ₂) ₃	0.05	0		4 atmos. for 40 minutes and 3 atmos. for 30 minutes		Vulcanization complete.
10	Crêpe	10	1:3:5 C ₆ H ₃ (NO ₂) ₃	0.08	0		3 atmos.	120	30 mins.—vulcanization begins, at 60 mins. becomes apparent, and in 120 mins. is complete.
11	Crêpe	10	1:3:5 C ₆ H ₃ (NO ₂) ₃	8	0	0.25 grm. MgO	3 atmos.	45	Vulcanization complete.
12	Crêpe	10	β-tetranitronaphthalene.	24	0		3 atmos. for 90 minutes and 4 atmos. for 30 minutes		Vulcanization complete.
13	Crêpe	10	β-tetranitronaphthalene.	24	3		3 atmos.	150	Vulcanization complete; product possesses an abnormal volume much greater than the form.
14	Crêpe	10	β-tetranitronaphthalene.	1	3	0.35 grm. piperidine	4 atmos. for 30 minutes and 3 atmos. for 30 minutes		Vulcanization complete.
15	Peruvian	10	Picramic acid	1	3		4 atmos.	40	Only traces of vulcanization observed.
16	Peruvian	10	Picramic acid	1	3		4 atmos. for 30 minutes and 3 atmos. for 90 minutes		Almost complete vulcanization, but product not so good as the preceding ones.
17	Peruvian	10	Picramic acid	0.8	3		4 atmos. for 30 minutes and 3 atmos. for 90 minutes		Incomplete vulcanization, product sticky, plasticity partly retained; little elastic and supple.
18	Peruvian	10	Picryl chloride	0.8	3		3 atmos.	30	Product surpasses Nos. 15, 16 and 17.
19	Peruvian	10	1:3:5-C ₆ H ₃ (NO ₂) ₃	2	0	1.2 grm. linseed oil	3 atmos.	120	Not vulcanized.
20	Mixture from 19	9.3	1:3:5-C ₆ H ₃ (NO ₂) ₃	3	3	1.2 grm. linseed oil	3 atmos.	45	Vulcanization complete.
21	Peruvian	10	1:3:5-C ₆ H ₃ (NO ₂) ₃	2	3		3 atmos.	60	Physical properties almost identical with No. 20.
22	Peruvian	10	0.05 grm. 1:3:5-C ₆ H ₃ (NO ₂) ₃ and 0.05 grm. sulphur	..	3		3 atmos.	30	Complete vulcanization.
23	Normal erythrene	10	1:3:5-C ₆ H ₃ (NO ₂) ₃	0.8	3	1.5 grms. colophony	3 atmos.	5	Vulcanization complete.
24	Normal isoprene	8	1:3:5-C ₆ H ₃ (NO ₂) ₃	0.8	2.4		3 atmos.	5	Vulcanization complete, in 15 mins. (3 atmos.) strongly over-vulcanized product obtained.
25	Abnormal dimethylerythrene	100	1:3:5-C ₆ H ₃ (NO ₂) ₃	7.5	3		3 atmos.	5	Vulcanization complete; elastic point of the vulcanizate lies at 100° C.

fluence on the vulcanization of caoutchoucs by means of sulphur, nitro-compounds or peroxides; they increase the extensibility and the constant K' , i.e., the tensile strength of the vulcanizate.

On normal vulcanization by means of benzoyl peroxide the physical structure of caoutchouc is not destroyed. It is, however, necessary to avoid excess of the peroxide and, for every given benzoyl peroxide mixture, to establish exactly the necessary temperature and time for the vulcanization. If not, the vulcanizate will exhibit, like "abnormal" and also like chemically pure caoutchoucs, negligible extensibility and tensile strength*; the protein compounds may be oxidized by the benzoyl peroxide, and their destruction may be accompanied by that of the physical structure of the given caoutchouc.

Caoutchoucs normally vulcanized by benzoyl peroxide exhibit both qualitatively and quantitatively all the typical properties of caoutchoucs vulcanized by either sulphur or nitro-compounds; when kept, they do not change.† Caoutchoucs vulcanized with a slight excess of benzoyl peroxide soon (1-5 days) develop on their surface soft, colorless, crystalline leaflets, which are as transparent as glass, and possess pronounced lustre; after the lapse of a longer time (1, 3 or 5 months) the vulcanizate begins to oxidize and gradually becomes sticky; finally it runs, becoming converted into a sticky, more or less viscous, plastic mass‡. The vulcanizate decomposes especially rapidly when in contact with the original, non-vulcanized mixture, which evidently acts as a "detonator."

Consequently, when different mixtures of caoutchouc and benzoyl peroxide are either heated or stored, two processes take place simultaneously: (1) Vulcanization of the original caoutchouc, this being connected with partial or complete union of the oxygen of the peroxide with the caoutchouc, and (2) oxidation of the caoutchouc by the benzoyl peroxide with formation of the highly sticky mass mentioned above.

The relative rates of these two processes determine the effect of the vulcanization, and experiment shows that these rates depend on the proportion of benzoyl peroxide, on the temperature, on the prolongation of the vulcanization, and on the nature and quantities of the foreign matters in the initial mixture.

Vulcanization of caoutchouc with benzoyl peroxide requires, therefore, increased attention or skill in the operator.

When once started at a high temperature, the process of vul-

*Presumably corresponding with over-vulcanization, in the case of ordinary M. and S. sulphur compounds. H. P. S.

†A few samples of vulcanized caoutchouc which have been kept for six months without change.

‡Some caoutchoucs, for instance, normal erythrene caoutchouc, vulcanized with a large amount of benzoyl peroxide, gradually solidify when kept, yielding a dense, brittle mass, easily powdered but absolutely without stickiness.

canization continues comparatively rapidly, even at the ordinary temperature. Thus, it was found that a mixture of normal erythrene caoutchouc and a small excess of benzoyl peroxide converted after 27 days into a very sticky, viscous mass, which later gradually runs or assumes the form of the containing vessel. When previously heated, without access of air, for two minutes at 85 degrees, the same mixture does not run when kept (at the ordinary temperature); on the other hand, the stickiness already present disappears spontaneously; the plasticity of fresh sections and their proneness to become sticky are lost, and the mixture gradually vulcanizes at the ordinary temperature, and finally even over-vulcanizes owing to the excess of benzoyl peroxide present.

It is seen that the relative velocity of oxidation, on the one hand, and of vulcanization on the other, depends on the character of the preliminary treatment, in the given case on the two-minutes' heating at 85 degrees.

This fact explains immediately why incomplete vulcanization protects caoutchouc from oxidation or decomposition in the air.

The benzoyl peroxide may be replaced by perbenzoic acid, and probably by ozone, ozonides of caoutchouc or terpenes, oxides of nitrogen, certain metallic peroxides, hydrogen peroxide, etc.

Further, my observations show that barium peroxide produces no trace of vulcanization in caoutchouc. Into natural Para caoutchouc were introduced 1 per cent, 5 per cent, 10 per cent, 15 per cent and 50 per cent BaO_2 , the mixtures being vulcanized for 5 minutes, 10 minutes, 30 minutes, and 2 hours with steam at 2, 3 and 4 atmospheres' pressure in a press; under these conditions the mixture underwent no change, its plasticity and even its light color remaining quite unaltered. This interesting observation lends further confirmation to the fact that vulcanization of caoutchouc by the above method takes place at the expense, not of the peroxides themselves, but of their active oxygen.

The accompanying table contains recipes for the vulcanization of different caoutchoucs with benzoyl peroxide. It must be pointed out, however, that the external conditions indicated in this table are by no means ideal.*

To conclude, in presence of 0.5-3 per cent of benzoyl peroxide, normal synthetic caoutchouc obtained on coagulation of its solution, undergoes at about 80 to 120 degrees C. incomplete vulcanization; the external appearance, and all the new properties of the product obtained compel the assumption that some forms of natural rubber represent products of incomplete (incipient) vulcanization caused by active oxygen.†

*The detailed recipes for the vulcanization of caoutchouc by means of benzoyl peroxide, together with other documents kept in my pocket-book, were unfortunately stolen from me.

†Or by compounds containing active oxygen, etc.

TABLE B. VULCANIZATION BY ORGANIC PEROXIDES.

Number of Experiment.	Caoutchouc Employed	Grams of Benzoyl Peroxide	Grams of Lead Oxide	Grams of Manganese Oxide	Grams of Foreign Substances	Pressure and Time of the Vulcanization in Press	Time in Minutes Occupied by the Vulcanization	Observations
1	Natural Para ..	6 of 3%	..	..	..	1 atmos. (116°)	5	Vulcanization complete; product quite transparent; pale cinnamon color.
2	Natural Para ..	20 of 10%	..	..	..	1 atmos.	15	Vulcanization complete.
3	Mixture of experiment 1.....	6	1.5	..	..	1 atmos.	5	Vulcanization complete; product differs from No. 2 only by its darkish color and its non-transparency.
4	Mixture of experiment 1.....	..	..	..	..	0.5 atmos.	15	Vulcanization complete; product opaque.
5	Natural Para ..	5 of 20%	..	..	..	2 atmos.	15	Vulcanization complete; product opaque.
6	Natural Para ..	5 of 1%	1.5	..	..	2 atmos.	15	Vulcanization complete; product opaque.
7	Natural Para ..	5 of 1%	..	1.5	..	2 atmos.	15	Vulcanization complete; product opaque and tougher and more leathery than Nos. 5 and 6.
8	Dimethylethylene "photopolymeride"	15.6 of 10%	..	..	..	Vulcanized at 80°	15	Almost complete vulcanization; product transparent; at higher temperatures the caoutchouc undergoes profound oxidation.*
9	Normal erythrene ..	6 of 10%	..	..	6 of colophony	1 atmos.	6	Vulcanization complete; over-vulcanized even; product translucent.
10	Natural Para ..	100 of 10%	10	..	..	2 atmos.	30	Vulcanization complete; product opaque and possessing sufficient tensile strength.†

*Products of acid color are formed, evidently identical with those appearing when this caoutchouc is kept in the air.

†When kept, this product does not change in six months.

Proceedings of the "Rubber Section"—Continued.

Two important addresses delivered before the Rubber Section of the American Chemical Society during the September, 1916, Convention were printed here last month. Below are given three other interesting papers. A full report of the symposium, in which some 20 rubber chemists participated, will be given in the December issue.

WET COMBUSTION IN THE NITROSITE-COMBUSTION METHOD FOR THE DIRECT DETERMINATION OF RUBBER.*

By L. G. Wesson and E. S. Knorr.

IN order to make more feasible the possible use in technical laboratories of the nitrosite combustion for the direct determination of rubber in rubber goods, we have attempted the application of "combustion in the wet way" to this analytical procedure.

The "nitrosite-combustion" method as described in a previous publication, is based upon the formation of the "nitrosite" of rubber by the action of nitrogen oxide gases upon the caoutchouc of the sample. This is then separated from other substances (fillers), and burned in a specially constructed electrically-heated combustion tube. The special apparatus and technique required was a decided obstacle to the general use of this method, even should its reliability be demonstrated, and we therefore turned to "wet combustion" as an escape from this difficulty.

In the course of our experiments, acetone-extracted crude rubber was first used. The nitrosite was formed in the flask used for the combustion, and after the complete expulsion of the rubber solvent (chloroform), the combustion followed in a manner quite similar to those later described. We obtained dependable values, 96.8, 97.0, 97.6 and 97.1 per cent $C_{10}H_{16}$. Average is 97.1 per cent; theoretical, 97.3 per cent $C_{10}H_{16}$.

In the regular analytical procedure this simple treatment of the nitrosite is not possible, since the latter must be separated from the mineral matter and other impurities by the use of some solvent, after filtration from the chloroform. We first used as solvent, acetone, which was added to the dry nitrosite in the combustion flask. The acetone was first evaporated off, then the flask was heated 1 1/2 hours by a boiling water bath whilst a current of dry air passed slowly through the flask. The value now obtained, (100.7 per cent) upon combustion, indicated a retention of acetone.

A repetition of this experiment with the use of only ethyl acetate as solvent gave 96.4, 97.1 and 97.0 per cent $C_{10}H_{16}$. These figures were more promising. Moreover, the ethyl acetate on evaporation left the residual nitrosite in a more porous, and thus

more favorable condition for rapid expulsion of the organic solvent than did the acetone. Ethyl acetate was therefore adopted as the solvent in all of the analyses of vulcanized rubber.

The use of acetic ester did not, however, eliminate our troubles with retained solvent, as we found when we next turned to the analysis of compounded rubber samples, instead of the raw gum. We believe that this difficulty explains most of the erratic results we had to the end of our work. We believe that we have now found the remedy for this retention of solvent in the addition of water, containing a drop of hydrochloric acid, to the nitrosite, and subsequent evaporation of this to dryness, after all solvent has been removed in the ordinary way.

In a sample compounded with 35.0 per cent Fine Para, using the method described, we found 34.7, 34.9, 34.8 and 34.2 per cent $C_{10}H_{16}$. Average is 34.7 per cent; theoretical, 34.4 per cent $C_{10}H_{16}$.

In a sample compounded with 40.0 per cent plantation rubber, we found 38.9, 39.8, 37.9, 38.1 and 37.7 per cent $C_{10}H_{16}$. The average is 38.5 per cent, and the theoretical value is 38.3 per cent $C_{10}H_{16}$.*

THE PROCEDURE.

PREPARATION OF THE NITROSITE FOR THE COMBUSTION. After the rubber

sample has been ground in a meat-chopper to pass a 20-mesh sieve, and 1/2 gram of it extracted 3 hours with acetone, and 1/2 hour or longer with chloroform, the extracted sample is allowed to dissolve in, or thoroughly absorb chloroform. A small Florence flask (75 cc.) is used, which may be about one-half full of the solvent. Nitrous oxide vapors, evolved from dilute nitric acid (specific gravity 1.3) and arsenic trioxide, are then passed through the cooled chloroform until the deep green color becomes permanent for, say, 15 minutes, and the whole allowed to stand over night for completion of the action.

The chloroform is then decanted through a dry Gooch crucible and asbestos mat (the former rests in an ordinary 60 degree filter funnel) into the combustion flask, from which the chloroform is then evaporated by means of a boiling water bath and a dry air current.† Meanwhile the residue in the Florence flask has been similarly dried. The separation of fillers and nitrosite is now brought about in the following way. Small portions (5 cc.) of calcium chloride-dried ethyl acetate are added to the residue in the Florence flask, the latter warmed, and the liquid

*These samples were kindly sent us by the Bureau of Standards.

†J. B. Tuttle, of the Bureau of Standards, has found that the chloroform-soluble residue thus recovered may be very appreciable, and it is to his suggestion that this modification is due.



L. G. WESSON.



E. S. KNORR.

*The article here published represents thesis work done by one of us (E. S. Knorr) in the course for the degree of Bachelor of Science in Chemistry from the Case School of Applied Science.

By Otto H. Klein, John H. Link and Frank Gottsch.

The percentage of fillers plus that of total acetone extract is subtracted from 100 per cent, and the difference recorded as rubber gum.

We hope, in conclusion, that further study and improvements of this method will eventually give a reliable and not too difficult procedure for the direct determination of rubber, not only in good quality compounds, but also in factice and other inferior substitute-containing rubbers.

by allowing the cases which have passed the absorption train to come in contact with heated copper oxide and then barium hydroxide solution. A precipitate ensues, but the amount is not appreciable for the results of the analysis.

	O No. 1	O No. 2	H	I	J	U No. 1	U No. 2	G No. 1	C	G No. 14
Pure Rubber (Fine).....	40.3	40.3	40.3	40.0	30.0	40.0	40.0	37.0	24.44	37.0*
Sulphur	2.0	2.0	2.0	4.0	3.0	3.0	3.0	3.6	3.0
Zinc Oxide	18.9	18.9	18.9	30.0	14.0	56.0	30.0	30.0
White Lead (Dibasic).....	18.9	18.9	18.9	15.0	11.11
Light Magnesia Carbonate.....	9.9	9.9	9.9	4.44
Hydrated Lime	2.0	2.0	2.0	6.67
Litharge	8.0	8.0	8.0	10.0	15.0	6.67
Whiting	26.0
Lithopone	20.0
Vermilion	15.0
Carbon Black	10.0
Golden Antimony	10.0	26.67
Magnesium Oxide	5.0
Aluminum Flake	17.0
Sublimed White Lead	32.0	20.0
Asbestos	11.11
Plumbago	8.89
Cure.....	Minutes	90	100	100	100	80	150	60
	Pressure	40 lbs.	40 lbs.	250° F	250° F.	250° F.	30 lbs.	38 lbs.	60 lbs.
Fillers Found.....	{ 58.76	59.36	58.72	55.00	67.03	58.60	57.56	60.03	74.11	60.44
	{ 58.71	59.43	58.40	54.70	67.79	57.40
Organic Acetone Extract.....	1.09	1.23	1.03	1.31	0.74	0.99	1.19	1.29	0.80	5.04
Free Sulphur	0.42	0.20	0.97	4.50	2.24	0.88	2.00	1.82	0.30	1.48
Rubber	39.75	39.17	39.44	39.34	29.60	39.53	39.33	36.85	24.75	33.04
Fillers in Dish	0.10	0.18	0.47	0.00	8.21	0.32	0.32	0.44	1.43	3.60
	0.00	0.36	0.82	0.09	5.51	0.95

Latex Rubber.

Aniline differs from other solvents in that rubber dissolved in it forms a thin solution which permits the mineral fillers to separate readily.

Samples *O No. 1* and *O No. 2* are the same, except that *O No. 2* was purposely over-cured. Sample *H* was prepared using the same recipe but by another manufacturer. Sample *H, I* and *J* were unintentionally under-cured. Sample *C* is a hard valve. Sample *G No. 14* contains caucho rubber.

The small amount of nitrobenzene is used, because it makes solution more rapid. It was found that semi-cured compounds dissolve more slowly than thoroughly cured soft stocks or very hard ones. With under-cured compounds a soft, pasty mass is formed, which is very slow to dissolve, while this does not occur if the material is properly vulcanized.

We found that in a few cases an additional digestion with half the quantity of solvent for five hours reduced the amount of mineral fillers about 0.5 per cent. In specification work it is advisable to make this second digestion after the ether has been expelled from the tube by heating.

Analysis of the fillers shows that the rubber as found by difference will not include the sulphur of vulcanization.

It will be noted that the sum of the percentages of rubber found and organic acetone extract is slightly greater than the percentage of rubber used in the recipe.

The fillers during vulcanization and afterwards in the course of analysis have combined with sulphur to form new compounds. If this combination of fillers and sulphur is a substitution of sulphur for some other acid radical, the resultant product would weigh less than the sum of the ingredients entering the reaction and the rubber found by difference would be slightly greater thereby.

We expect to continue these experiments when other samples are available, and a final report will be made on the subject when we have all the data at hand.

REPORT OF THE JOINT RUBBER INSULATION COMMITTEE.

THE Joint Rubber Insulation Committee, whose preliminary report was printed in THE INDIA RUBBER WORLD, February 1, 1915, has now completed a second report, which was presented in abstract to the Rubber Section of the American Chemical Society on September 29 by William A. Del Mar, the secretary of the committee. The second report, like the first, presents a specification for high-grade rubber insulation for electric wires and cables, and an analytical procedure for use in connection therewith.

The specification is identical with that in the preliminary report, except that the first clause is altered to read as follows:

"A 30 per cent fine Para or best quality plantation *Hevea* rub-

ber compound with mineral fillers, shall be furnished." The change consists in the substitution of "best quality plantation" for "smoked first latex," which appeared in the earlier report.

The analytical procedure has been changed in two important particulars, and a number of minor improvements have been made. One of the changes is the elimination of the terebene method, and the substitution of a modified ash method, for the determination of fillers and rubber. This method is a modification of one devised by G. H. Savage. A general outline of the procedure is given on the diagram below. It will be seen that the residues from the alcoholic potash saponification are treated with hydrochloric acid to remove organic matter, and the part insoluble in acid is dried and divided into two parts, one of which is used to the determination of sulphur, and the other ignited. A sulphur determination is also made on the ash. The rubber hydrocarbons as a percentage of the total sample are given by the following formula:

$$\text{Rubber Hydrocarbons} = 100 \times \frac{C}{4} \left[1 - \frac{I-I}{D} - \frac{H}{G} \right]$$

The total weight of sample used in the determination is 4g. and the letters *C, D, E, F, G,* and *H* represent the weights in grams of the substance indicated in the diagram.

The other important change is the adoption of the Bureau of Standards nitric acid-bromine method for the determination of total sulphur.

A qualitative test for organic fillers has also been added.

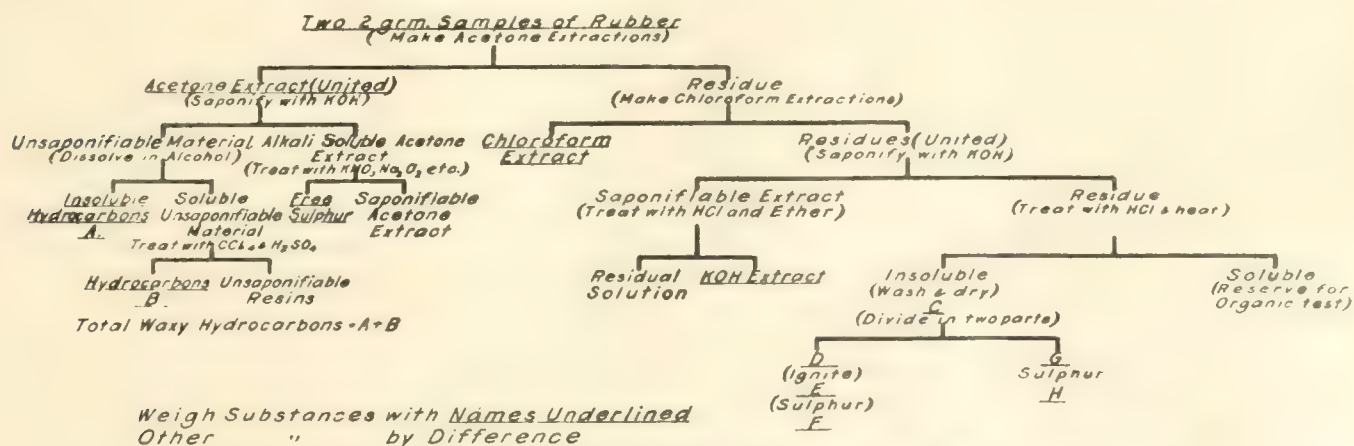
The complete report will not be available until it has been approved by the General Committee, which appointed the Joint Rubber Insulation Committee. It is hoped that arrangements for publication will be made in about a month.

The Joint Rubber Insulation Committee has now been at work for five years and has held 25 meetings, in addition to numerous sub-committee meetings. The committee has been an active one, and its influence has been widely felt, the specification and the greater part of the preliminary analytical procedure being now accepted as standard by electrical engineers and rubber chemists.

The following abstracts from the report read at the meeting of the Rubber Section, give the details of the determination of rubber hydrocarbons and total sulphur, and should be read in conjunction with the preliminary report referred to above.

ALCOHOLIC POTASH EXTRACT.

SECTION 28. Dry the residues from the chloroform extractions at 50 to 60 degrees C. until the odor of chloroform can no longer be detected; unite the residues from the two 2-gram samples in a 200 cc. Erlenmeyer flask. Add 100 cc. alcoholic potash solution and boil for four hours under a reflux condenser. Filter the solution by decantation through an 11 cm. hardened filter paper into a beaker and wash twice, using each time 25 cc. hot



OUTLINE OF METHOD OF RUBBER ANALYSIS EXCLUSIVE OF TOTAL SULPHUR DETERMINATION.

absolute alcohol and then wash thoroughly with hot water. Wash any rubber on the filter paper back into the original flask and reserve this for the determination of rubber hydrocarbons. Evaporate the solution to approximate dryness, take up in warm water and transfer to a separatory funnel. Acidify with 30 cc. 5 normal hydrochloric acid, using this to rinse the beaker. Add sufficient water to make the bulk of the solution 100 cc. When cool add 40 cc. ether, using it to rinse the beaker in 20 cc. portions. Shake the aqueous and ethereal solutions thoroughly. After complete separation, draw off the aqueous solution and treat in another separatory funnel, with a fresh 20 cc. portion of ether. Continue to shake the aqueous solution with fresh portions of ether until a colorless portion has been obtained, then shake out twice more. Unite the ethereal solutions and wash with successive additions of water, continuing twice after the water shows no acid reaction. Filter through a plug of extracted cotton into a tared flask, wash the filter and funnel with ether, evaporate the ether without boiling and dry the residue at 95 to 100 degrees C. Cool in a desiccator and weigh. Continue to dry until constant weight is obtained.

RUBBER HYDROCARBONS.

SECTION 29. Add to the flask containing the rubber residue from the alcoholic potash extraction, sufficient water to make the total volume of the solution 125 cc. and then add 25 cc. concentrated hydrochloric acid. Heat for an hour at 97 to 100 degrees C. Decant the supernatant liquid through a hardened filter paper on a Buchner funnel 7 cm. in diameter, using suction; wash the residue with 25 cc. hot water and decant. (While a Buchner funnel is recommended, it is permissible to use an 11 cm. hardened filter paper with platinum cone, in a 60 degree funnel). Perform this entire treatment with water and hydrochloric acid, three times and save the first and second decantations for the "organic matter" test described in Section 36. The rubber at this stage should be white and practically free from black specks of undissolved fillers; if not, continue the acid treatment until the black specks disappear. (If carbon is present, all the particles of rubber will be grayish, bluish, or black, depending on the form and quantity of carbon used. Black specks in light particles of rubber usually indicate the presence of lead sulphide which must be removed to prevent the formation of lead sulphate on igniting the residue *C*. Add 150 cc. hot water to the flask and let stand on a steam bath or hot plate for half an hour and decant through the filter paper. Return to the flask any rubber that goes on the filter paper. Repeat until the washings are free from chlorides (See Section 36). Transfer all the rubber in the flask to the filter paper and dry as much as possible by suction. Wash the rubber with 50 cc. of 95 per cent alcohol, using suction. Transfer the entire residue to a weighing bottle. Dry at 95 to 100 degrees C. for an hour, cool in a vacuum desiccator under reduced pressure and weigh. Dry for a half hour, cool and weigh, repeating this process until either constant weight is reached or the weight starts to increase. Let this weight be represented by *C*. On a portion *D* of this residue *C* determine the ash *E*, according to Section 30 and the sulphur *F* in the ash *E*. Determine the sulphur *H* in another portion *G* of residue *C*. Make all sulphur determinations as described under "Total Sulphur."

SECTION 30. Place about 0.5 grams of residue *C* into a weighed porcelain crucible. Let the weight of residue be represented by *D*. Heat gently, gradually driving off the volatile matter. When the crucible has ceased to smoke, raise the temperature gradually to between 450 and 500 degrees C. until all organic matter has been burned away, which is usually indicated by the ash becoming white. (An electric muffle furnace with pyrometer is recommended for this purpose.) Cool in a desiccator and weigh, the weight of ash being represented by *E* in the formula for rubber hydrocarbons. Make sulphur test on ash by the method described under "Total Sulphur." If, however, $50 \times C \times E$ is not

over unity, the determination of sulphur in the ash may be omitted and *F* assumed to be zero.

Then,

$$\text{Rubber Hydrocarbons} = 100 - \frac{C}{4} \left[1 - \frac{E-F}{D} - \frac{H}{G} \right]$$

expressed as a percentage of the total sample.

TOTAL SULPHUR

SECTION 31. Place 0.5 grams of rubber in a porcelain crucible of about 100 cc. capacity. Add 20 cc. nitric acid-bromine reagent, cover the crucible with a watch glass, and allow to stand for one hour. Heat very carefully for an hour, remove the cover, rinsing it with a little water, and evaporate to dryness. Add 5 grams of the KNO_3 - Na_2CO_3 fusion mixture, and 3 to 4 cc. of distilled water. Digest for a few minutes, and then spread the mixture half way up the side of the crucible to facilitate drying. Dry on a steam bath or hot plate. Fuse the mixture, using a sulphur-free flame until all the organic matter has been destroyed and the melt is quite soft. Allow to cool, place the crucible in a 600 cc. beaker, and cover with water. Digest three or four hours on the steam bath. Filter into an 800 cc. beaker, washing thoroughly with hot water. The total volume should be about 500 cc. Allow to cool, add 7 to 8 cc. concentrated hydrochloric acid to the filtrate, and heat on the steam bath. Test the solution for acidity with Congo paper and add 10 cc. of hot barium chloride solution. Allow to stand over night, filter, wash, weigh the barium sulphate and calculate to sulphur.

INTERPRETATION.

SECTION 34. The percentage of rubber shall be considered to be the sum of the rubber hydrocarbons, saponifiable acetone extract, unsaponifiable resins, chloroform and alcoholic potash extracts, expressed as percentages. If the chloroform extract is over 3.0 per cent of the rubber so calculated, subtract the excess from the rubber. If the KOH extract is over 1.8 per cent of the rubber, as first calculated, subtract this excess also from the rubber.

ORGANIC FILLERS.

SECTION 36. Transfer the first and second decantations of the hydrochloric acid solutions to a carefully cleaned porcelain dish and add 20 cc. concentrated sulphuric acid. Place dish on steam bath or hot plate to drive off water and hydrochloric acid. A pronounced charring of the residue indicates the presence of organic matter soluble in water or hydrolyzed by hydrochloric acid.

Examine filter paper and rubber while decanting acid solution and again while washing free of chlorides. Some types of organic fillers not removed by water and hydrochloric acid, would be plainly visible at this point.

Place a small portion of residue *C* under a microscope and examine for fibrous and other characteristic organic material. If organic fillers are indicated and not clearly proven by this test, place 1 gram of the organic sample in a beaker, add 75 cc. xylol and heat on hot plate until the rubber is dissolved. Decant xylol solution and wash residue with ether several times by decantation. Dry residue and examine under the microscope.

NEW YORK RUBBER MANUFACTURERS BUSIER.

According to the report of the Industrial Commission of the New York State Department of Labor, the manufacturers of rubber and gutta percha goods in that State employed from 16 to 21 per cent more workers from March to August, 1916, than were employed in June, 1915 (the basis of computation), and in each of the months the increase over the same month a year ago ranged from 25 to 40 per cent. The payrolls of these manufacturers ran from 33 to 41 per cent higher than the same months last year.

What the Rubber Chemists Are Doing.

VISCOSITY INDEX OF RUBBER.

THE researches of K. Gorter on the viscosity index as a standard for the preliminary testing of the quality of rubber are abridged as follows, by "Chemical Abstracts" (October 10, 1916). The viscosity index is the logarithm of the viscosity of a 1 per cent solution and is superior as a standard to the viscosity, being less dependent on the temperature than the latter, 1 degree causing a variation in the viscosity index of only 0.005. Hence it is not necessary in viscosity determinations to keep the temperature constant by means of a thermostat. The viscosity index multiplied by the factor 70 gives the tensile strength of the rubber sample. Gorter's viscosimeter consists of a pipette with a 10 cm. capillary stem with an opening 1.42 mm. in diameter, the whole fitting into a 150 cc. Erlenmeyer. The indicated capacity of the pipette is 15 cc., and its constant 9.8 at 26 degrees C. One gram of rubber is dissolved in 120 cc. benzene (not purified from thiophene) with shaking, using a brown flask. The solution is filtered after 24 hours and the concentration determined, after which the viscosity is determined by the pipette. The relative viscosity of a rubber solution equals the period of delivery, divided by the constant of the viscosimeter for the solvent used. The viscosity of a rubber solution is dependent on the dimensions of the viscosimeter used; hence to obtain comparable results the same instrument must invariably be used.

THE WEBER TEST FOR SUN CRACKING DEMANDS PRECAUTION.

D. S. Twiss in the "India Rubber Journal" sounds two important warnings in regard to the use of C. O. Weber's reagent.

The Weber test depends upon the partial oxidation of strips of rubber with a mixture of acetone and an aqueous solution of hydrogen peroxide. Although this mixture is said to keep unaltered for a long time, nevertheless there is a distinct possibility of its deterioration. While acetone-peroxide compound is very soluble in acetone and also other organic solvents, such as ether and benzene, it is only sparingly soluble in water, and because of the presence of water in the Weber mixture, crystals of the compound in a practically pure condition may gradually be deposited after a month or so, some of them continuing to float in the liquid. Of course, the separation of such a crystalline compound causes a diminution in the oxidizing power of the liquid reagent so that tests made with it on various dates may not be accurately comparable.

Great care should be taken to prevent the accumulation of any considerable quantity of these crystals in empty bottles or elsewhere, particularly in a dry condition. Despite the seeming harmlessness of the compound thus formed and the fact that it can even be melted at 97 degrees C., it is capable of exploding with frightful violence if subjected to a shock, or if heated above its melting point. One thousandth of an ounce, when heated in an open test tube, will explode with such force as to shatter the tube, and the explosion of a greater quantity in a large glass bottle would be exceedingly dangerous because of the flying fragments of glass. Obviously the practice of using a freshly prepared reagent not only insures accuracy but personal safety as well.

THEORY OF COLD VULCANIZATION OF RUBBER.

The following abstract of the researches of F. W. Hinrichsen and E. Kindscher on cold vulcanization is from the "Journal of the Society of Chemical Industry" (September 15, 1916).

According to C. O. Weber (in 1894) caoutchouc combines with sulphur chloride to form a series of compounds of which the richest member in sulphur contains 23.62 per cent. Measured

quantities of a solution of purified Para rubber in dry thiophene-free benzene, were treated with quantities of a solution of sulphur chloride in benzene in excess of that corresponding to Weber's formula, and the reaction product was purified as described by Weber. In eight experiments the sulphur content found ranged from 15.58 to 28.37 per cent. In another series of experiments, quantities of the rubber solution containing 0.5 gram of rubber were treated with quantities of sulphur chloride solution containing from 0.433 to 1.299 grams S_2Cl_2 , under conditions to exclude the presence of moisture, and after three or four weeks, portions of the solutions were withdrawn and analyzed. The amount of sulphur chloride fixed by the rubber ranged from 0.2526 to 0.2795 grams, corresponding approximately to the formula $(C_{10}H_{16})_2S_2Cl_2$. The higher results obtained in the first series are attributed to adsorption of sulphur chloride or of sulphur liberated therefrom. The yellowish-white addition compound of caoutchouc and sulphur chloride when boiled with alcoholic sodium hydroxide solution is converted into a dark brown substance corresponding to the formula, $C_{20}H_{20}S_2$. In the technical cold vulcanization process it is considered that adsorption of sulphur chloride by the rubber first takes place, followed by slow chemical combination and by liberation of sulphur from the excess of sulphur chloride. Cold-vulcanized rubber may thus be regarded as an adsorption product of sulphur in a solid or semi-solid solution of the compound, $(C_{10}H_{16})_2S_2Cl_2$, in excess of rubber.

METHODS OF ANALYSIS.

DETERMINATION OF PARAFFIN IN BLACK SUBSTITUTES.

A. HUTIN in "Le Caoutchouc & La Gutta-Percha" contributes the following method for the determination of paraffin and waxes in black rubber substitutes:

Many black substitutes contain paraffin, added intentionally in considerable proportions. Substitutes that contain from 10 to 30 per cent of paraffin break with a section showing small white spots, and are friable. If 30 per cent paraffin is present the mass is whitish. Below 10 per cent no such evidence is visible.

The method of C. W. Weber is used for the analysis of substitutes, modified as follows, for the determination of paraffin. The acetone extract, obtained as usual, is treated with 100 cc. of 97 to 98 degree alcohol; the mixture heated by plunging the container into boiling water and decanting the liquid on a tared capsule. This operation is repeated 5 or 6 times. Evaporate the liquid and dry residue to constant, and weigh.

Paraffin, ceresin and other waxes present are thus obtained together. In general, the material is white or pale yellow and composed of impure paraffin. It is necessary to use 98 per cent alcohol, otherwise the paraffin, etc., will not be wholly dissolved.

RUBBER SUBSTITUTE.

"Chemical Abstracts" (October 10, 1916) gives the following account of the method of H. Bayer (German patent No. 288,968, June 3, 1914) for the manufacture of an improved substitute for rubber. A rubber substitute is obtained from fatty oils, liquid at the normal temperature, as they are employed in the factice manufacture; by treating the balsam-like substance obtained by dissolving and heating sulphur in oil, with an energetic oxidizing substance (preferably dilute nitric acid). The product is soft in the heat, but elastic and tough when cold, and after washing it can be vulcanized with sulphur. The sulphur is at the same time oxidized, as evidenced by the presence of large amounts of sulphuric acid in the nitric acid. This mass is not completely soluble in any of the known solvents, but it swells up with carbon bisulphide, benzene and many other organic

solvents, to a gelatinous, doughy mass which, upon spontaneous evaporation, or evaporation with the aid of gentle heat, to remove the solvent, remains as a homogeneous, very tough and elastic product. This substance, alone or in admixture with solutions of resin, caoutchouc, gutta percha, etc., can be mixed with filling and variously colored. In the swollen state, this mass is mixed with 10 to 20 per cent pure flowers of sulphur, warmed gently, under pressure, on rolls, and, after evaporating the softening agent, it is vulcanized at a temperature slightly above the melting point of sulphur.

For example, 1 kilogram of linseed oil is heated with 150 grams of sulphur at 266 to 320 degrees F., until the sulphur has been completely dissolved, and the linseed oil has been converted into a black-brown liquid, which upon cooling, no longer separates sulphur. This liquid is poured into 3 to 4 times its weight of dilute nitric acid, and warmed for several hours on a water bath, with stirring, until the liquid has been converted into a yellow substance, soft when hot and elastic and tough when cold, and large amounts of sulphuric acid are present in the nitric acid. This product is washed thoroughly with water and dried in a thin layer at 212 to 230 degrees F. Of this mass 1 kilogram is worked up into a gelatinous dough with 200 grams asphalt and 200 grams flowers of sulphur, with the addition of benzene; then dried and vulcanized by heat. The final product is claimed to serve in many cases as a substitute for rubber, and to be much cheaper.

CHEMICAL PATENTS.

THE UNITED STATES.

REGENERATING VULCANIZED RUBBER. The process of regenerating vulcanized rubber which consists in comminuting the material, boiling it in an alkaline solution, and heating the entire mass of material in an atmosphere of inert gas to a temperature approximating but short of the melting-point, and continuously stirring the mass. [Bernadus Johannes Franciscus Varenhorst, The Hague, and Jean Gérard Fol, Delft, Netherlands. United States patent No. 1,198,975.]

THE UNITED KINGDOM.

SUBSTITUTE FOR RUBBER. A mixture of colophony, caoutchouc, sulphur, naphtha, dry white lead or Spanish white is prepared with heat and may be used for sealing wax or in place of ebonite. [R. Castells, 240, Provenza, Barcelona, Spain. British patent No. 7,703 (1915).]

RUBBER RECOVERY FROM RUBBERIZED FABRICS. Rubber is recovered from fabric impregnated with vulcanized rubber, by heating it with boiling tetrachloroethane. Solution of the rubber is complete in about one hour. After removing the fabric, the rubber is recovered from the solution by adding water and distilling off the solvent with the water; or the solvent may be distilled dry, provided care be taken not to overheat the rubber. If desired, the free sulphur may be removed by a short preliminary treatment of the rubberized fabric with hot tetrachloroethane, the operation being interrupted before the rubber begins to dissolve. [C. de Villers, Neuilly, France. British patent No. 10,146 (1915).]

COAGULATING LATEX. In contradistinction to the usual processes employed, the present invention consists in treating the latex with gases obtained by the destructive distillation of wood in suitable retorts, after removal of the tar from the gases.

The advantages of the processes are:

(1) The product obtained is better than that obtained by application of smoke.

(2) As fuel for the distillation of the wood, the charcoal from a preceding distillation can be used. Not all the charcoal, however, is required.

(3) The wood tar obtained forms a valuable product which is available on the plantation for conserving the plants against disease.

(4) The process is cheap. [E. C. R. Marks, 57 Lincoln Inn Fields, London, W.C., England. British patent No. 11,615 (1915).]

UTILIZING WASTE RUBBER. India rubber is removed from tire fabrics, without destroying them, by treatment in *vacuo* with a solvent, at a temperature which produces strong ebullition (212 to 230 degrees F. in the case of xylol). A circulating movement of the liquid is produced by a cone-and-tube device, similar to that used in laundry apparatus. The rubber is first stripped from the fabric by means of xylol or other solvent; the fabric is then treated with cold xylol in an ordinary washer to remove lightly-adhering rubber, resins and free sulphur; next the fabric is placed in a cage in an autoclave containing pure xylol. The autoclave is connected with a reflux condenser which has a pipe connection to a vacuum pump. After heating twice in the autoclave by a steam coil, the fabric is washed in clean xylol, again treated under pressure at about 150 degrees F., and finally washed, and centrifugally treated, dried by means of a current of inert hot gas, and bleached. The liquids containing rubber can be used for dissolving the granular rubber derived from the stripping of the fabric. [H. Debaugé, 2 Rue de Penthievre, Paris. British patent No. 100,961.]

THE DOMINION OF CANADA.

RUBBER VULCANIZATION METHOD. The process of vulcanizing india rubber substance which consists in submitting the substance in the presence of sulphur, sulphides, or other vulcanizing agents, to the action of ultra violet rays, under a variety of conditions of heat, pressure or vacuum in solid films or in solution. [Gustave Bernstein, Chamalières, Puy de Dôme, France. Canadian patent No. 170,142.]

RECOVERING RUBBER STOCK. The process of recovering rubber stock from vulcanized rubber which consists in bringing the vulcanized rubber in contact with a solution comprising resin and a material obtained by the action of dissolved resin on vulcanized rubber, and incorporating this solution with the comminuted vulcanized rubber and removing the solvent therefrom. [Hermann Goldman, New York City. Canadian patent No. 170,393.]

OTHER CHEMICAL PATENTS.

THE UNITED STATES.

1,200,296. Elastic material for use in tires. Maurizio Barricelli, Bygdø, near Christiania, Norway.

1,200,692. Hard rubber composition. Leo H. Baekeland, Yonkers, N. Y.

THE DOMINION OF CANADA.

171,032. Filler for tires. Frank A. Hager, Portland, Oregon.

THE UNITED KINGDOM.

8,487 (1915). Treatment of latex on scrap rubber. C. A. Icken, East Coast Road, and St. V. B. Down, 43 The Arcade—both in Singapore.

101,127. Impregnating compositions of gutta percha, rubber or balata. E. C. R. Marks, 57 Lincoln's Inn Fields, London, England.

ANOTHER CHEMICAL EXPOSITION IN 1917.

Hardly has the Second National Exposition of Chemical Industries been closed when plans are forming for the third exposition, to be held next fall, and it is said that its success is already assured. An additional floor in the Grand Central Palace, New York City, has been engaged and plans are being made to use this, and possibly another, in addition to the first two floors which were occupied this year. Interesting details of the enlarged scope of the Exposition will appear in due time.

The New York State Industrial Safety Congress will convene at Hotel Onondaga, Syracuse, New York, December 11, 12, 13 and 14. Addresses will be delivered by experts on fire prevention, factory sanitation, safeguarding of machinery and other factors pertaining to industrial safety. Some of the evening lectures will be illustrated. Employers, superintendents and factory foremen are invited to attend.

The Ocotillo Rubber of Arizona.

ACCORDING to report, a San Francisco chemist has discovered that the candlewood shrub, or ocotillo, which abounds in the arid plains of Arizona and New Mexico, contains large quantities of a rubber-like or gutta-like gum, and a company has been incorporated in Arizona for the purpose of extracting this gum and placing it upon the market. The company is to lease nearly a million acres of land in Texas and is attempting to lease State lands in Arizona where the shrub is abundant. As to value of the gum commercially, one story is that it is suitable for the manufacture of chewing gum; another is that automobile tires have been made from it, and so on. Of course there are the usual statements to the effect that this discovery is to revolutionize the rubber industry. The possibility that the gum may have even a minor value leads us to give its pedigree.



THE OCOTILLO (*Fouquieria splendens*).

a, calyx and pistil. b, corolla. c, stamen.

The ocotillo (*Fouquieria splendens*) grows wild from north-west Texas, through New Mexico and Arizona to Southern California, thence south to Lower California and the Mexican States of Coahuila, Chihuahua and Sonora. It is variously known as the vine cactus, coach whip, Jacob's staff and candlewood. In its wild state the shrub grows from 6 to 20 feet high, sparingly branched from the base, the branches up to an inch in diameter, branchless and apparently leafless, their swaying tips brilliant with scarlet blossoms—the flame of the “candle.”

The branches are covered with thorns or spines. These are the petioles of the leaves. Like many other desert plants the candlewood has but few leaves, which soon dry and shrivel, and finally fall away, leaving only sharp thorns about an inch long, thus incorrectly classing it as a cactus. It is easily propagated from cuttings, and is much used in Mexico to form an impenetrable hedge. The long, slender stems are used as the substratum over the beams which hold up the grass and clay roofs of adobe houses. It is stated that as much as 400 tons of shrub

can be taken from an acre, and that new growth on that acre will reach maturity in three to five years. It has been known that the ocotillo (to use its Mexican name) yields a resin, a wax and a gum. It is this latter which is now pronounced valuable in the chewing gum business and the rubber industry. A company has been organized for the purpose of extracting it from the bark of the plant by a patented process.

Of much local interest in the city of Phoenix, Arizona, was the “Arizona Tire, a Product of Ocotillo Gum.” This was manufactured by the W. C. Hendrie Rubber Co., Torrance, California, and displayed in the show window of a local dealer. That doubters may be forestalled in their unbelief E. W. Snyder, superintendent and chemist of the Sunset Rubber & Supply Co., Los Angeles, California, subscribes and swears before a notary public that:

The tread in this tire is scientifically compounded from ocotillo gum, smoked sheet rubber, sulphur, zinc, white lead, litharge and other compound ingredients commonly used in the manufacturing of automobile tire treads.

As to the great general usefulness of the gum he writes, addressing the Arizona Chicle Gum Co., Mesa, Arizona:

After carefully testing out ocotillo gum, I find that it has a commercial value in the greatest of all industries—the tire busi-



THE OCOTILLO IN ITS NATURAL HOME.

ness. It is a very valuable ingredient for hose, belting and tire frictions, immense quantities of which are manufactured throughout the world. The guayule industry has become one of the leading industries of the rubber business and has proven to be very profitable. The ocotillo gum has a greater field because it

can be successfully used in many other commercial lines. With my experience as a chemist and a practical rubber man, I can give ocotillo gum nothing but the very highest praise.

An interesting point brought out by Judge W. H. Stilwell of Arizona is thus stated:

It is not unreasonable to suppose that rubber produced in this country will meet the demands of the climate and elements more successfully than rubber produced elsewhere.

J. D. Crawford, whom "Arizona" describes as an American chemist and wage earner in the rubber industry, is given the credit of the discovery of the ocotillo as a rubber producer. Mr. Crawford, so says "Arizona," discovered the value of guayule and "sold his processes to the Madero brothers for a small consideration." His discovery of guayule is 18 years old, that of ocotillo is 3 years old.

The plan of the Arizona Chicle Co. is not to manufacture either chewing gum or automobile tires. Instead it will extract the gum and sell first to manufacturers of the articles named and later to any and all who find the gum of use. The initial plant is planned for a daily capacity of 600 tons.

H. E. Shrum, of Phoenix, Arizona, who has charge of the sale of stock, kindly sent the editor of THE INDIA RUBBER WORLD a small sample of the bark of the ocotillo plant and a piece of vulcanized rubber. Whether this was a bit of the tire compound cited above does not appear. He further stated that the company expected to be producing gum by the first of the year. As to the cost of the gum, it is stated that it can be produced in quantity for 10 cents a pound.

If this project proves successful in adding to the sources available for the production of rubber, or even plastics from plants indigenous to our own country, it will certainly be well worth while. Perhaps this desert "cactus" may become as valuable as the once neglected guayule shrub which has proven of such substantial use in the rubber industry.

In the meantime the rubber trade awaits with interest elucidation of the following points:

FIRST—What percentage of ocotillo gum entered into the composition of the "Arizona" tire.

SECOND—Would it be possible to make a tire or anything else in rubber using ocotillo gum, and compounding and curing it without the addition of "plantation sheet" or any other rubber?

A frank answer to both of the above will tell the story of the value of the gum beyond peradventure.

RUBBER GLOVES FOR X-RAY SURGICAL OPERATIONS.

Rubber gloves for surgical operations where X-rays are used are made opaque to these rays by being impregnated three or four times, at intervals of about a half hour, with a paste obtained by thoroughly mixing the following ingredients in a chemist's mortar:

100 grams finely ground lead carbonate.

50 grams of rubber solution (similar to solution used for repairing cycle tires).

50 grams of light mineral oil.

Large size surgeon's gloves need from 40 to 50 grams of paste each; the paste is applied with a soft brush, preferably on the interior surface of the gloves, the latter being turned inside out and filled with talc or a similar powder. The paste adheres better when the surface has been coated beforehand with diluted rubber solution.

This paste is not affected by prolonged contact with water containing phenol, nor by strong alcohol, but it blackens if the gloves are placed in boiling water for any length of time, and then it develops a tendency to crack when the gloves are stretched in any way.

In French military hospitals many doctors coat their hands with the paste above described before putting on their rubber gloves. The paste can be easily washed off by using mineral oil. ["Journal de Pharmacie et de Chimie."]

THE ELECTRICAL EXPOSITION.

FOR two weeks in October the Electrical Exposition and Motor Show of 1916 was held in the Grand Central Palace, New York City. As in previous similar exhibitions, this served to show the progress in electrical achievements during the year, many exhibits being particularly interesting and attractive. Out of a total number of 105 exhibitors there were some which were more or less related to the rubber industry. Among these might be mentioned the following:

The Habirshaw Electric Cable Co., Yonkers, New York, exhibited a very complete line of samples of rubber insulated cables, including the large armored cable made for the Interborough Rapid Transit Co. and laid under the Harlem River; and a sample of the submarine cable made for the Signal Department of the United States Government. This cable was made and tested at the Habirshaw works in one piece, 34 miles long, which is now in service in the Philippines.

The Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pennsylvania, exhibited a large number of electrical devices for the modern residence, office and factory. Electric fans, motors, transformers and rectifiers for charging storage batteries were also shown, as well as lightning arresters for the protection of electrical circuits, lighting fixtures for street use, and motors for various industries.

The General Electric Co., Schenectady, New York, showed the modern application of its Mazda lamps, of various capacities. A mechanical display showed exactly what the consumer gains by the use of these over other lamps, as demonstrated by the use of a mechanical meter. An electrically lighted fountain, an electrical clock, a reproduction of a modern show window illuminated with miniature lamps, X-ray plates, motors, generators and transformers completed the exhibit.

The Electric Storage Battery Co., Philadelphia, Pennsylvania, displayed a large number of storage batteries of its manufacture, those used in submarine vessels, in electric vehicles, in mine locomotives, and also for central lighting and power stations for telegraph and telephone service. There were also various batteries used for automobile starting and lighting, wireless telegraphy, fire alarm and gun firing.

Another storage battery was the "Edison," shown by the Edison Storage Battery Co., Orange, New Jersey, which is used in a great variety of ways for lighting and motor power in vehicles, boats, etc., and for supplying current to modern searchlights, telegraph, telephone, time clocks and light machinery. The Edison electric safety mine lamp was also shown.

The New York Edison Co., New York City, showed the work of its various bureaus in a very comprehensive exhibit, demonstrating the capabilities of its service. For instance, there was a completely equipped electrical hospital, an X-ray room, an electro-mechanical gymnasium, a dental hospital, and a photographic studio. A three-room apartment, in miniature, was shown, furnished with figures, furniture and electric fittings, all arranged to show the different lighting effects.

The vacuum cleaner would be far from practicable were it not for the rubber hose which gives it portability. The Frantz Premier Co., Cleveland, Ohio, and the Hoover Suction Sweeper Co., New Berlin, Ohio, had exhibits of these machines. Rubber tubes form a part of the electrical milking machines which were seen in operation in the Dairy division, several prize Guernseys and Holsteins being exhibited by a well-known condensed milk company.

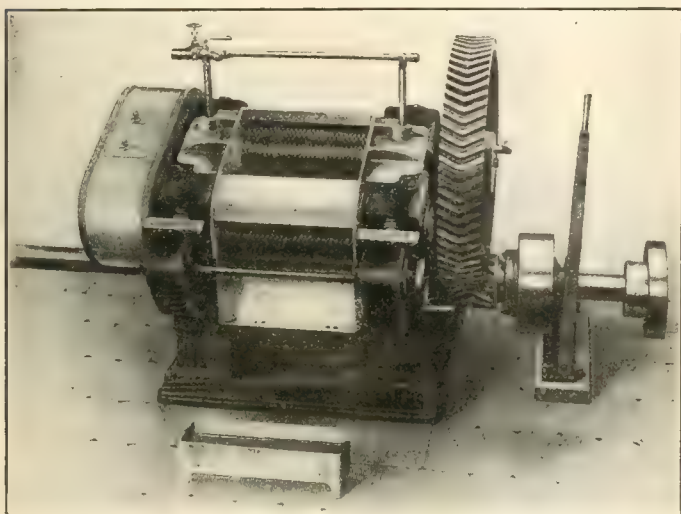
The S. S. White Dental Manufacturing Co., Philadelphia, Pennsylvania, among other items of its exhibit of a modern dentist's office, showed an electrically heated rubber tube for conveying the gas administered to patients at about the temperature of the body, thus lessening excitement and irritation. Prepared rubber and rubber dam for dental purposes were also shown.

New Machines and Appliances.

A DUTCH TYPE TWO-ROLL PLANTATION WASHER.

MACHINERY builders in Holland are keeping pace with the ideas of modern design and construction of rubber washing machines. The illustration clearly shows a strongly built, standard machine that is capable of giving durable service.

The heavy, cast iron bed-plate is of the one-piece pattern and supports the side frames in which are mounted the journals for



the two rolls. These are made of deep chilled iron, measuring 12 by 18 inches, accurately turned and diamond corrugated. The adjustable roll is taken up by two powerful screws mounted in the side frames and operated by a cross shaft and hand wheel. Provision is made to prevent oil from coming in contact with the rolls.

The machine is underdriven and controlled by a lever friction clutch tested to stand 18 horse-power. It is driven by a steel pinion on the main shaft that meshes with the main gear keyed to the back roll. Both gears are of the double helical cut type and a safety screw prevents breaking of the gear teeth when subjected to unusual strain. The front roll is driven by gearing from the back roll, and a cover that completely encloses both gears prevents accidents. A perforated pan is provided for catching the rubber as it passes between the rolls, and a strainer box retains the smaller particles that fail to mass.

The machine weighs 5,000 pounds and when packed for shipment measures 61 by 55 by 48 inches, and an additional crate measures 92½ by 7¾ by 7¾ inches. [J. L. Nering Bogel & Co., Deventer, Holland.]

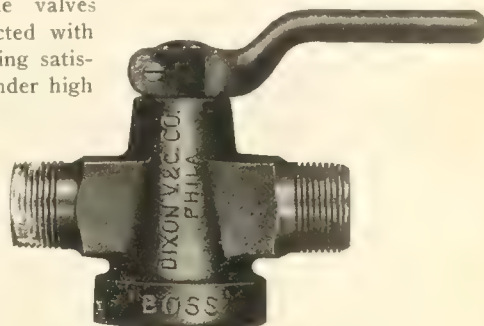
HIGH PRESSURE COUPLINGS AND THROTTLE VALVES.

Reliable hose clamps and dependable throttle valves are indispensable equipment where high pressure strain or compressed air is used. A clamp that will not blow off under high pressure or give way through long service is essential. Such are the claims made by the manufacturer of "Boss" couplings. Its parts are few, comprising spud, stem, nut and clamp,—the long stem affording ample hose-gripping surface and the dovetail clamp accommodating a variety of outside hose diameters. For hose



with extremely thick walls or with woven cotton cover, special clamps are furnished.

"Boss" throttle valves are also constructed with the object of giving satisfactory service under high pressure and rough usage. The walls are extra heavy and the thread shoulders reinforced to withstand unusual strains. While operating freely, these valves will not close nor open by vibration. [Dixon Valve and Coupling Co., Philadelphia, Pennsylvania.]



COMBUSTION STOVE FOR SMOKING RUBBER SHEET.

There are various methods and appliances used in smoking rubber that has been prepared in the form of sheets. On most plantations the smoke is applied externally to the rubber that is suspended on racks or poles in a smoke house. The stove shown in the illustration produces clean, sparkless smoke by the combustion of wood, coconut husks or similar material. It is strongly constructed of metal and supported by four legs. The fuel chamber, which occupies the lower part of the stove, is provided with grate bars, draft regulating slide for controlling the volume and temperature of the smoke, and a fuel charging door. The upper part of the stove contains the spark arrester, which retains and precipitates all solid substances in the smoke. Ash trays are provided that may be easily lifted off, that their contents may be emptied at intervals. The smoke outlet at the top is designed to fit an ordinary 5-inch stove pipe. [United Engineers, Limited, Ipoh, Federated Malay States.]

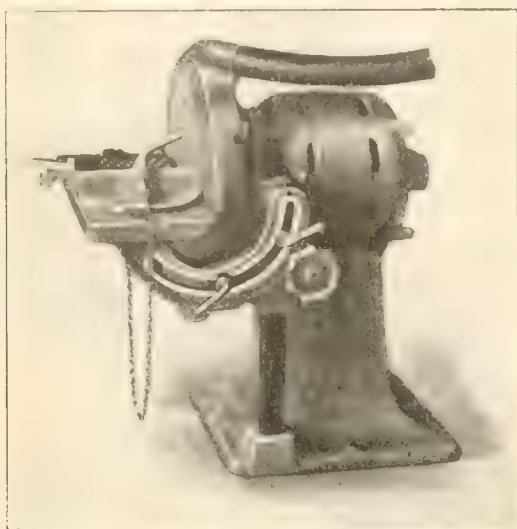


THE PIONEER DUSTLESS GRINDER.

The self-contained motor driven grinding machine here shown has several features that doubtless would find favor and practical utility in a rubber factory, not only in the machine shop and pattern room, but, for example, in smoothing off the fin that is left after trimming molded goods, and also rough grinding hard rubber articles with plain surfaces.

The machine is adapted to be placed on a bench within easy reach, and starts at full speed by the touch of a button. It is provided with a vacuum dust collecting system that carries the dust to a removable settling pan located in the column of the machine. The tilting table is equipped with a graduated adjustable angle gage, operated by a small hand wheel. Locking levers are provided to hold the table firmly in any position, while the entire mechanism is supported on a square column upon which it

is adjusted vertically. The following are the particulars: Diameter of disk, 10 inches; base 9 inches square by 8 inches high; height of set all, 15 inches; angle, 4° by 11° inches; vertical



adjustment, 4½ inches; angle adjustment, 15 degrees upward, 45 degrees downwards; single phase, 60 cycle, 220 volt motor. [The H. A. Smith Machinery Co., Syracuse, New York.]

M. & W. RATCHET WRENCH AND ROLL ADJUSTING SCREWS.

Adjustment of the rolls of heavy washers, mills and refiners is a matter that requires force and considerable skill. The powerful screws controlling the roll adjustments are usually operated by hand wheels or bar levers attached to the screw heads and, moreover, power is sometimes used to aid in coarse adjustments.

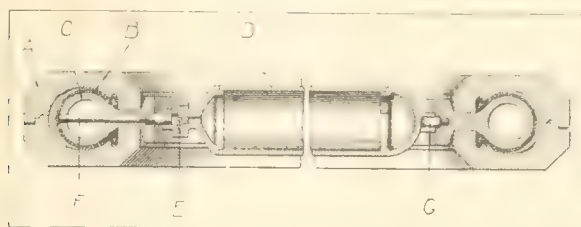
In the accompanying illustration is shown a combination ratchet wrench and adjusting screw of standard size and thread that readily recommends itself to mill users. It is undoubtedly a time saver as well as a powerful tool for conveniently obtaining both coarse and fine adjustments of the rolls.

Carefully selected materials are used in construction of this device, the lever being cast steel, the cover plate, steel, the screw, vanadium steel, and the pawls and shifter levers, drop forgings. [Morgan & Wright, Detroit Rubber works, Detroit, Michigan.]

MACHINERY PATENTS.

GAMMETER'S INTERNAL PRESSURE VULCANIZING APPARATUS.

Hollow rubber articles are cured while subjected to internal fluid pressure, according to this invention, which is here illus-



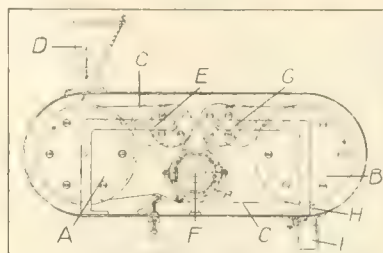
trated and described, as applied to the making of tire casings. The drawing is a cross-section of a two-part tire mold *A*, showing casing *B*, core *C*, and the round flask *D*, containing carbon dioxide.

The flask is charged in a separate apparatus and a fusible plug *E*, inserted. One end of the flask is connected to the pipe *F* that conveys the gas under pressure to the space between the core and the casing. The other end of the flask is supported by a stud *G*.

The heat of the steam immediately melts the plug and releases the gas, which applies pressure to the inner part of the casing during vulcanization. [John R. Gammeter, Akron, Ohio, assignor to The B. F. Goodrich Co., a corporation of New York. United States patent No. 1,200,603.]

ULTRA-VIOLET RAY VULCANIZER.

Solutions of india rubber are vulcanized by ultra-violet rays, care being taken that the operation is not continued sufficiently long to injure the rubber. The sulphur employed may be replaced



by any sulphide which is decomposed by the rays; for example, carbon, allyl, or antimony sulphide. Very dilute solutions of the vulcanized rubber thus obtained; for example, 0.5-0.6 per cent, may be used for cementing, and only a very thin cementing layer is required.

A maximum of 1.25 per cent is claimed. The illustration is a sectional side elevation of the apparatus, which may be employed for treating any liquid or solid product in thin layers with ultra-violet rays.

It is an enclosed machine supported by suitable standards, and underdriven by a longitudinal shaft located on one side of the casing. Keyed to the shaft is a worm that engages a worm wheel driving the drum *A*, which also drives the opposite drum *B* by sprocket gearing. The endless belt carrier *C* passes around these drums and is driven by them. The product to be treated being introduced through the hopper *D*, is carried by the endless belt over the adjustable guide roller *E*, down and all around the quartz mercury vapor lamp *F*, then over the adjustable guide roller *G* and around the drum *B*. The material is removed from the belt by a scraper *H* and delivered to a receptacle *I*. [H. P. M. A. Olivier, Paris, France. British patent No. 7,823 (1915). Not yet accepted.]

APPARATUS FOR EXHAUSTING THE INTERIOR OF RUBBER ARTICLES.

In many processes of pressure cure, as applied to the manufacture of boots and shoes, hollow perforated forms of special construction are used. The present invention, however, provides a device that permits the use of solid forms or lasts such as are commonly used in footwear manufacture. The accompanying drawing is a side elevation partly in section, showing this device applied to a solid boot form.



The metal cap *A* is adapted to fit over the boot form *B*, and comprises a vacuum chamber *C* and a tapered, wedge-shaped conduit *D* which separates the boot from the form and establishes communication between the inner surface of the boot and the

vacuum chamber.

The metal cap is provided with a tapered nozzle *E* that fits over a tapered nipple *F* and low pressure or a vacuum is supplied from the pipe *G*. A seal *H* laps the edge of the boot to insure a tight joint during application of the preponderating outside pressure. [Chester J. Randall, assignor to The Goodyear's Metallic Rubber Shoe Co., both of Naugatuck, Connecticut. United States patent No. 1,199,420.]

OTHER MACHINERY PATENTS.

THE UNITED STATES.

- 1,198,790. Collapsible former for building tire casings. J. D. Tow, Akron, Ohio.
- 1,198,874. Mold for manufacture of rubber thimbles. I. S. P. D. vizes, England.
- 1,198,875. Pressure applying vulcanizing mold. T. S. P. D. vizes, England.
- 1,198,932. Repair vulcanizer. A. F. Lawrence, San Marcos, assignor of one-half to N. Hanke, Hays County, La. in Texas.
- 1,199,314. Automatic device for coating the constituent elements of a laminated cohesive interwound band. L. A. Subers, East Cleveland, Ohio.
- 1,199,449. Machine for making plastic articles. W. J. Burns, assignor to The Peerless Vulcanite Co.—both of Bridgeport, Conn.
- 1,199,674. Demountable rim tool. H. M. Du Bois, assignor of one-half to N. W. Du Bois, both of Houston, Texas.
- 1,200,009. Repair vulcanizer. A. B. Nelson, assignor to National Rubber Co.—both of Rockford, Ill.
- 1,200,014. Tire head placing device. M. Parndon, assignor of one-half to G. A. Rudd, both of Barberton, Ohio.
- 1,200,016. Tire building machine. M. Parndon, assignor of one-half to G. A. Rudd, both of Barberton, Ohio.
- 1,200,070. Rubber roll. F. H. Banbury, East Orange, N. J., assignor to Birmingham Iron Foundry, Derby, Conn.
- 1,200,183. Dental vulcanizer. G. B. Fraley, Liberty, N. Y.
- 1,201,190. Demountable rim tool. J. Johnson, Perryville, assignor of one-half to T. A. Sen, Boone Terre, both in Missouri.

THE DOMINION OF CANADA.

- 170,643. Cementing machine. The United Shoe Machinery Co., of Canada, Limited, Maisonneuve, Quebec, Canada, assignor of M. F. Bregan, Lawrence, Mass.
- 170,938. Tubing machine feeder. The Canadian Consolidated Rubber Co., Limited, Montreal, Quebec, Canada, assignee of G. F. Fisher, Roselle, N. J.

THE UNITED KINGDOM.

- 7,491 (1915). Making double texture knitted fabrics. T. Adams, Limited, Stoney street, and W. R. Westmoreland, 10 Regent street, New Bedford, both in Nottingham.
- 7,643 (1915). Tire tool. R. McMullan, 9 Rathcool street, Belfast, Ireland.
- 7,960 (1915). Latex coagulating machine. A. Woosnam, 10 New Court, Lincoln's Inn, London.
- 8,075 (1915). Pneumatic tire mold. F. A. Byrne, 2 Ludgate Hill, Birmingham.
- *8,524 (1915). Electric repair vulcanizers. O. C. Dennis, Cuyler avenue, Chicago, Ill.
- 8,643 (1915). Making non-skid studs. C. G. Renold, and H. Renold, Limited, Burnage Works, Didsbury, Manchester.
- 8,757 (1915). Coating fabrics. A. Olier et Cie, Usines St. Rémy, Clermont-Ferrand, Puy de Dôme, France.

NEW ZEALAND.

- *37,589. Portable repair vulcanizer. A. B. Low, 88 South Broadway, Denver, Colo.

THE FRENCH REPUBLIC.

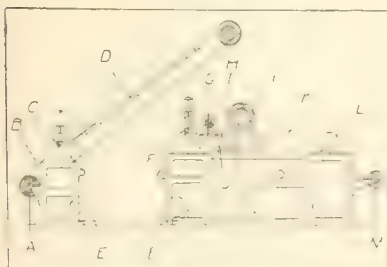
- *480,190 (November 9, 1915). Improvements in apparatus for manufacturing rubber footwear. Boston Rubber Shoe Co.

* Denotes patents for American inventions.

PROCESS PATENT.

METHOD OF MAKING DOUBLE TEXTURE FABRICS.

The manufacture of double texture fabrics is a particularly difficult process when one of the fabric layers is thin or loosely woven, as is the case with mohairs employed in automobile tops.



These difficulties are provided against by the present method, which is described in connection with the accompanying illustration of a spreading machine.

From the supply roll *A*, the fabric *B* passes under the spreading knife *C*, which distributes a thin coating over the upper surface. The fabric then passes around the drying table *D*, and down and around idler rollers *E* to a second spreader *F* that applies to the coated surface a thin film of highly adhesive rubber solution. Before this is dry the fabric is passed under pressure roller *G*, where it meets and is superposed by the face fabric *H*

According to the usual method, the pressure necessary to effect proper adhesion results in forcing the solution through the thin fabric so that it appears on the face; moreover, the pressure mats down the surface and destroys the mill finish of the goods.

fed from supply roll *I*. The double fabric then travels around a guide roller *J*, the heated drum *K* and the guide roller *L*, to the tensioned wind up roller *M*. [James Meade, Stoughton, Massachusetts. United States patent No. 1,199,400.]

OTHER PROCESS PATENTS.

THE UNITED STATES.

- 1,199,249. Fibrous rubber material for use in the manufacture of water-proof sheeting, tubing and the like. J. W. H. Dew, London, England.
- 1,199,922. Rubber article and process of making same. R. B. Price, New York City, assignor to Rubber Regenerating Co., Mishawaka, Ind.

THE UNITED KINGDOM.

- 7,477 (1915). Endless bands of canvas and rubber. T. Shopet, Southgate, Devises, Wiltshire.

THE FRENCH REPUBLIC.

- *480,402 (November 7, 1915). Improvements in processes of increasing porosity in rubber goods. Boston Rubber Shoe Co.

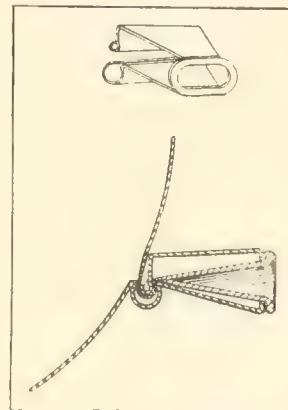
THE GERMAN EMPIRE.

- 288,418 (May 1, 1914). Hirschhorn net is worked up with rubber to impart strength to it. L. Fenzl.

MISCELLANEOUS PATENTS.

TOY BALLOON VALVE.

A device for closing the air or gas inlet to toy balloons, punching bag, or football bladders, and other inflatable articles of rubber, is the subject of this invention. This metal closure device



is made in one piece, comprising two flat plates positioned one over the other and joined at one end, forming the mouth-piece. The free end of the lower plate is formed into a pocket, into which the flange provided at the end of the upper plate may be depressed. The neck of the deflated balloon or bladder is slipped between the two plates and through the mouth-piece, over which it is lapped. As soon as the article is inflated the plates are compressed, forcing the neck of one into the pocket of the other, and thereby closing the air

passage. [Robert Head, New York City, assignor to Howe-Baumann Balloon Co., Newark, New Jersey. United States Patent No. 1,201,045.]

FRENCH TYPE CHAINS FOR DUAL SOLID TIRES.

A recent French patent covers articulated, detachable non-skid chains for motor vehicles equipped with dual solid tires.

This chain comprises a series of non-skid plates connected by chain sections with special links provided at regular intervals for fastening the chain to the rim of the wheel. The chains occupy the annular space between the dual tires as shown in the diagram.

The drawing on the left is a circumferential section and on the right, a transverse section of the wheel. *A* is the rim, *B* the



spokes, *C* the tires and *D* the non-skid plates that are connected by chain sections *E*. These sections are anchored by short chains *F* to double links *G*, located at spaced intervals in the rim between the dual tires. The links are fastened in the rim by taper keys *H*, that are held in place by straps or cotter-pins. [Société Schneider & Cie. French patent applied for February 29, 1915.]

Editor's Book Table.

STRAIGHT AMERICA. A CALL TO NATIONAL SERVICE. By Frances A. Kellor. The Macmillan Co., New York City. [200 pages.]

THIS book contains much interesting matter well worth the attention of every citizen of the United States. Its scope is defined by the following extract from a prefatory letter written by Ex-President Roosevelt. It says: "Emphasis is rightly laid upon the need of nationalism in all of the big questions of the day, from education to industrialism, for we cannot have a real American citizenship unless that citizenship is emphatically national. We cannot deal with immigration, unless we deal with it from the standpoint of a national Americanism. We cannot solve our industrial questions, especially the question of transportation, including all questions of interstate industrial enterprise engaged in manufactures and commerce, except from a national standpoint."

OFFICIAL AMERICAN TEXTILE DIRECTORY, 1916. COMPILED by the Textile World Journal. Bragdon, Lord & Nagle Co., New York City. [Flexible cloth covers. 8vo, 650 pages. Price, \$2.]

This directory, which is published annually, gives a large amount of valuable information regarding the textile industry of the United States. This comprises nearly 7,000 establishments, including not only cotton, woolen, silk, flax and jute mills, but establishments devoted to dyeing, finishing, bleaching, printing and other branches of the textile industry. Full information is given regarding each of these mills, the names of officers, agents, superintendents, and the character of the goods made, and such other items as the number of spindles, looms, whether the mill uses steam or water power, etc. The book is arranged geographically, alphabetically, and according to style of goods manufactured, and will undoubtedly be found extremely useful to all engaged in these industries.

AUTOMOBILE NOMENCLATURE. THE SOCIETY OF AUTOMOBILE ENGINEERS, New York City.

Confusion frequently arises from lack of uniformity in naming and describing parts of automobiles, and one of the objects of the Standardization Committee has been to decide upon the terminology for universal use in such descriptions. The report of this committee gives a list recommended by the Society of Automobile Engineers which contains over 600 separate names of the more important parts, this list being developed through the combined efforts of engineering and service representatives from a number of the leading automobile manufacturers. Undoubtedly it will serve to prevent confusion and to enable automobile owners, dealers and manufacturers to more accurately and thoroughly understand exactly what is meant by various terms.

HENDRICKS' COMMERCIAL REGISTER OF THE UNITED STATES for Buyers and Sellers. S. E. Hendricks Co., Inc., New York City. [4to, 1,738 pages. Price \$10.]

With the present number, this standard publication rounds out a quarter of a century of usefulness. The work is especially devoted to the interests of the architectural, contracting, electrical, engineering, hardware, iron, mechanical, mill, mining, quarrying, railroad, steel and kindred industries, containing about 350,000 names and addresses, with upward of 45,000 business classifications. These lists contain the names of concerns handling the various products of these industries from producer to retailer. An innovation is a list of trade names, brands and titles of identification, this portion of the book being printed on a tinted paper, so as to be easily and quickly identified by the user, and numbering 202 pages, or in the vicinity of 10,000 names. This list includes many trade names of specialties manufactured of rubber. Automobile and motor car names are given in a sepa-

rate list in another portion of the book. The book will be found of value to buyers of the various classes of goods and materials in the industries of which it treats.

GREEN MANURES AND MANURING IN THE TROPICS. BY P. de SORNAY. Translated into English by F. W. Flatteley. John Bale, Sons & Danielsson, Limited, London, England. [Large 8vo, 466 pages. Price, 16s. net.]

In India, Malaya and the West Indies and throughout the tropics and sub-tropics generally, the question of manuring is an important one. This book which treats the cultivation of the *Leguminosæ* crops, is one which gives much information regarding this special method of feeding nitrogen to the soil. Many queries are answered in this book, which will enable the planter to solve some of the difficulties of enriching the soil. The work will be found helpful to those who would learn how to cultivate legumes, either for seed and oil, fodder, cover-crops, or as green manures. There is a very complete index and also a table of French and English equivalents which will be found useful for reference.

INDUSTRIAL ACCIDENT PREVENTION. ISSUED UNDER THE direction of the Industrial Commission, New York State Department of Labor. [54 pages.]

The Industrial Commission of the State of New York has issued a pamphlet which gives in condensed form a vast amount of information regarding industrial accidents and many suggestions for their prevention. The causes of such accidents being given, such precautions are suggested as mechanical guards, industrial hygiene, prevention of fatigue of employees, their welfare and safety, education of illiterate workmen, and the advertising of safety by various means, such as bulletin boards, pictures, danger signs, letters in pay envelopes, books of rules and moving pictures. Workmen's committees are advised for seeing that safety suggestions are carried out, and education in first aid to the injured is also advised. The book is one which will be advantageously read by every employer of labor.

A NEW RUBBER PLANTERS' JOURNAL.

"The Nederlandsch Indisch Rubbertijdschrift" (The Netherlands India Rubber Journal) is a new bimonthly publication devoted to the increasingly important rubber problems of Holland and her colonies. The new bimonthly is under the management of K. L. F. Goelst, and W. J. Van den Leemkolk, and is published in Batavia, Java. It is the first paper devoted to this industry to be published in the Dutch East Indies, and is the official organ of the Rubber Planters' Association there.

The contents are largely signed contributions from practical men in various branches of the rubber industry. There are essays on selection of seed, planting, tapping, cultivation, diseases of *Hevea*, coagulants, accelerators, vulcanization, besides general articles on the future of planting in the Netherlands Indies, and profits and losses in management. The market and statistical departments are very comprehensive, and here the Dutch headings are supplemented by English translations, to render this information more widely available. The new publication starts out with an excellence which bespeaks for it a useful and prosperous future.

PAN-AMERICAN MAGAZINE RUBBER ARTICLES.

The "Pan-American Magazine," New York City, for September has finely illustrated articles on "The Rubber Industry of the Amazon" and "Impressions of Manaos," both by L. E. Elliott, F.R.G.S., together with an article on "Old Travelers on the Amazon," the last-mentioned relating to the explorations of early travelers in the first half of the nineteenth century.

NEW TRADE PUBLICATIONS.

THE General Electric Co., Schenectady, New York, is sending out Bulletin No. 44,419, which is devoted to gears and pinions. It is of the usual excellence of the publications on trade matters sent out by this company, being fully illustrated, giving much information regarding the manufacture of gears, the technical requirements, and diagrams showing comparative sizes of gear and pinion teeth, graphically shown in exact size.

* * *

The Firestone Tire & Rubber Co., Akron, Ohio, has sent to all its agencies a novel window hanger, showing, in a tabulated arrangement, the prices of its leading sizes of tires. The hanger is about 20 by 25 inches, printed in brilliant colors, and the figures are large enough to be easily read from a distance.

* * *

"Bulletin Sales Service" published by the Faultless Rubber Co., Ashland, Ohio, dated October, 1916, gives full plans for an opening celebration which may be put in operation by any druggist with such assistance as is afforded by the Faultless company. Full details are given as to the advertising, both in the local newspapers and in the stores, and for the latter purpose printed matter, window cards and prize tickets are furnished, suggestions being given regarding combination offers and free souvenirs which have been found practicable and not too expensive where others have held similar openings. Pictures and descriptions are given for arranging attractive rubber goods window displays and a reproduction of an advertisement is shown which will appear in a large number of national magazines during November, and the advice is to hold the opening on November 11, thus taking advantage of such advertising.

* * *

The J. P. Devine Co., Buffalo, New York, is distributing its Bulletin 105, which treats of apparatus required by the chemical and allied industries. The booklet gives in detail such apparatus as cast steel autoclaves, reduction kettles, nitrating, sulphonating and fusion kettles, vacuum pans and evaporators, steam jacketed pans, digestors, etc. Like all of the Devine publications, it is excellently arranged and beautifully printed, each page showing a finely drawn illustration of the article described.

* * *

The Link-Belt Co., Chicago, Illinois, has issued two finely printed and illustrated pamphlets describing the modern coal and ashes handling machinery which that concern has recently installed for the Victor Talking Machine Co. at Camden, New Jersey, and for the W. H. Grundy Co., Bristol, Pennsylvania.

* * *

"A Visit with the Firestone Organization, Its Men—Its Factory—Its Branches" is the title of a large, handsome and profusely illustrated brochure recently issued, primarily to show the progress in method and machinery which has helped so materially toward giving the utmost in tire service at the lowest possible cost. Nor has the personal equation been forgotten in this review. Firestone success depends upon the health, happiness and personal responsibility of every worker in the organization from H. S. Firestone down to the office boys, quite as much as upon improved machinery and scientific management, and so considerable space has been devoted to the operatives in the various departments, both at work and at play. They have a splendid club house across the street with assembly hall and dining rooms, a barber shop, swimming pool, facilities for the enjoyment of every healthful indoor exercise and recreation, free medical and dental treatment and several other benefits.

Beginning with the man who alone controls the unloading of coal and feeding of a battery of boilers of 12,000 horse-power capacity, one is shown by word and picture the efficiency methods and devices at every point in the making of a motor car tire

which have made Firestone quality, prices and volume of business what they have become in 16 years. Painsstaking thoroughness and rigid standards are everywhere to be seen—in the purchase of all raw materials; the washing of crude rubber; the supply of filtered water and filtered air always at proper temperature; ample drying of the sheeted rubber; careful mixing; proper aging of the mixed rubber before use; calendering more than once for thin sheets; constant inspection and frequent tests of sheet rubber and fabric; exact cutting of side wall rubber to size and of fabric on the bias to insure greater strength and resiliency; absolute uniformity of vulcanization; thorough inside painting of cases and a rigid final inspection. Firestone rims and truck tires are also produced in the same thoroughgoing manner, according to standards laid down by a body of skilled chemists and engineers.

The importance and method of scientific drying and frictioning of the fabric to extract all atmospheric moisture without impairing the natural tensile strength of the cotton before filling with rubber are particularly emphasized, while the tire building machine which puts on every layer of fabric at uniform tension has been properly termed an epoch-making invention. Indeed, the volume, the precision and the output would be impossible without the varied and wonderful types of improved machines which work in large batteries under the watchful eyes of men of superlative skill, experience and loyalty.

* * *

The B. F. Goodrich Co., Akron, Ohio, has published a pamphlet, entitled, "Devices That Make for Motor Truck Efficiency," which is a reprint of a portion of the larger book, "Motor Trucks of America," the edition of which was exhausted before all requests for it could be filled. The pamphlet shows various auxiliary devices for loading, whereby the trucks can be quickly loaded, carry much and deliver expeditiously. Clear and explicit drawings illustrate these various devices.

* * *

The Pennsylvania Rubber Co., Jeannette, Pennsylvania, is sending to dealers a large four-page folder, describing in particular the merits of the company's latest automobile tire—the Bar-Circle. The cover shows a representation of this tire, which, as the name indicates, has a tread design composed of alternate bars and circles; the descriptive lettering being in contrasting colors. Within the folder, red and black lettering against the cream background brings the advertising matter into striking prominence, and the tread design is carried out as a border. The Vacuum Cup and Ebony treads are also shown. Prices on the Bar-Circle are given, and an order post-card is attached to the folder by sealing at one end.

* * *

The Brunswick-Balke-Collender Co., Muskegon, Michigan, is sending out its first piece of trade literature to advertise its Brunswick tires. This is a handsome hanger, lithographed in several brilliant colors and measuring about 24 by 36 inches. The principal figure is a huge tire showing the novel tread. In one corner is a picture of an English style country house in front of which stands an automobile. The shield trade-mark is also shown in red and yellow, with an Old English initial in black. Appropriate wording is given and the whole forms a brilliant and effective piece of advertising.

* * *

"Oral Hygiene," a neat little journal devoted to the dental profession, in its October issue, has a long article telling of the work done by the Forsyth Dental Infirmary in Boston, Massachusetts, for the members of the Massachusetts militia prior to their departure for the Mexican border. The article shows several illustrations of the infirmary, and the dentists operating upon the army men, and in one picture is shown the founder of the institution, Thomas A. Forsyth, president of the Boston Belting Co.

Interesting Letters from Our Readers.

THE MECHANICAL RECLAIMING PROCESS.

TO THE EDITOR OF THE INDIA RUBBER WORLD:

DEAR SIR—I have read with much interest the report of your address at the chemical meeting. Your reference to the "pioneers" of the rubber industry is most pleasing. But are you not mistaken in naming Mr. Clapp as an inventor in the reclaiming process? He was one of the pioneers beyond question, but he acquired his knowledge of the business through J. B. Forsyth as I understand it. Mr. Forsyth one day gave me a detailed account of how he was the first one to reclaim rubber and how the health authorities of Boston compelled him to discontinue the work at Roxbury on account of the odor arising from it. Thereupon he persuaded and assisted Mr. Clapp to engage in the business at Hanover and was the sole user for a while, but later admitted the Boston Shoe Co. to a supply.

The Boston Shoe Co. had three years' start of its competitors in use of reclaimed and that was the basis of its subsequent prosperity.

It was very clear from Mr. Forsyth's statement that the process had its origin at Roxbury, and that Mr. Clapp was associated at Hanover, as a matter of friendship, to establish him in the business.

GEORGE WATKINSON.

[A pioneer in rubber himself, Mr. Watkinson brings up a very interesting point, and we are more than pleased to give the reason for our faith. We believe that Eugene H. Clapp was the real inventor of the "mechanical process" in reclaiming and this is why:

The real beginning of the reclaiming of vulcanized scrap was accomplished by Hiram Hall at the Beverly Rubber Works in 1858. The scrap was ground fine, boiled in hot water, (later it was devulcanized in hot steam), mixed with tar, spread on cloth and "solarized." Later J. B. Forsyth reclaimed vulcanized scrap, but did not remove the fiber. Eugene H. Clapp, who was a close friend of Forsyth, as Mr. Watkinson states, took over the grinding and devulcanizing of scrap for the Boston Belting Co., and did a small business. While doing this he invented the "air blast" process which removed all of the fiber and produced a far superior stock, that was at once in demand. The "air blast" he kept secret for several years and built up a big business because of it. In other words, he was the first to produce "mechanical" reclaimed rubber that could be used in general work, and for many years was the only source of supply for the trade.—THE EDITOR.]

THE RUBBER CHEMIST'S PROBLEMS.

TO THE EDITOR OF THE INDIA RUBBER WORLD:

DEAR SIR—In your recent address before the rubber chemists, published in the October issue, the introductory letter, which you describe as coming from an old-time rubber superintendent, appeals to me as being somewhat peculiar. Its contents may be judged from different points of view, and in replying it would hardly be fair to assume either that his attitude is wholly incorrect or yet quite correct.

The most difficult position among the many branches of industrial chemistry is doubtless that of the rubber chemist, the more so because of a seeming unwillingness in certain quarters to accord credit where credit is due.

In most modern industries it has been found necessary to analyze the raw materials, and, in very many cases also the product, as, for example, fertilizers, rubber goods, beers, etc. Many years of such analysis have developed standard methods; and today a chemist working in a fertilizer factory has his daily routine carried on automatically, yet his work is correct and valuable, but his position simple.

An entirely different proposition confronts the rubber chemist.

Certainly most rubber chemists do routine work only, and many even think that is all there is to be done. Of course, to analyze crude rubber and other raw materials, such as mineral fillers, substitutes and specification goods, routine analysis is sufficient. But considering the intricacies of compounding, vulcanization, etc., this requires altogether more varied activity and knowledge than any routine work in other branches of industrial chemistry. But this is not all a real rubber chemist has to do. We must remember that many mechanical rubber goods are used in almost every industry, and some are subjected to various chemical processes. Any practical rubber man must admit that there come daily different complaints and questions, as, for example, can you make rubber rollers which will stand 73 per cent sulphuric acid, or rubber hose to withstand the action of acetic acid, or rubber washers to withstand chlorine gas, and hundreds of similar queries. Who should solve these problems? Would it not be hopeless to mix, without any chemical knowledge, dozens of compounds just to try them out, or should we give to the customer anything we may believe may do? We often hear that factories offer acid hose, one compound hose for all acids, like a single remedy for all sicknesses; and yet it is a fact that a compound which will withstand concentrated hydrochloric acid will not withstand 20 per cent acetic acid and vice versa. Since satisfactory service is the best fundament for business, every detail must be worked out. So here we have examples of the great difficulties rubber chemists have to meet, and while, to solve such problems, depends more upon individual capability than experience alone, it so happens that the chemist occasionally fails to solve such problems; and if the chemist fail, what chance has a practical rubber man without any chemical knowledge? But even though a manufacturer has had unfortunate experience with one chemist, this does not justify him to judge all the rest by the same measure.

I have cited here only a few examples of daily occurrence in rubber factories, but there is an unlimited field for research work on such problems as you described in your address. We live in progressive times and are forced to be progressive in order to meet competition; and, since the rubber industry is closely allied to chemical industry in general, a good chemist is absolutely necessary to keep the factory up to date. Although a poor chemist is just better than none, a good one will prove one of the best possible investments.

D. REPOY.

Passaic, New Jersey, October 13, 1916.

JUDICIAL DECISIONS.

MILLER RUBBER CO. AND OTHERS V. CITIZENS' TRUST & SAVINGS BANK. This case involved the subjects of bankruptcy; reclamation of property; consignment and sale; principal and agent; contract of agency and commissions.

By a contract, the claimant made bankrupt its exclusive agent for the sale of its goods within a certain territory, and agreed to keep him supplied with a stock which should remain claimant's property until sold to bona fide customers in the usual course of business. The contract did not fix, nor reserve the right to fix, prices at which the goods were to be sold, nor require bankrupt to account for the proceeds, but required him to report those on hand each month, and pay for goods sold, at a stated discount from list price, with provision for a credit of four months, if desired, up to a certain amount. Bankrupt was permitted to mingle the claimant's goods with his other stock, and the contract required claimant to furnish him

free of charge with advertising matter imprinted with his business name. The Court held, that while, as between the parties, the contract was one of consignment; as to creditors of the bankrupt, title to the goods passed to him, and they could not be reclaimed from his trustee.

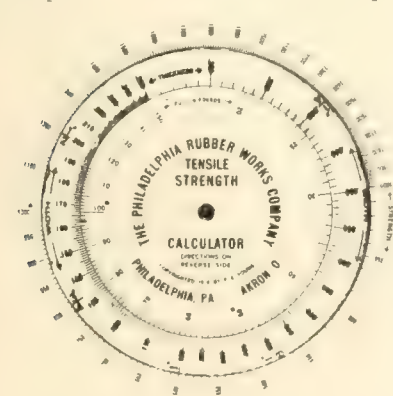
A contract under which goods were furnished to an agent for sale was construed, and it was held that the commissions were based on the sum named in the price list, less 5 per cent discount for cash. [The Federal Reporter, Vol. 233, page 489.]

DANIEL V. ELECTRIC HOSE & RUBBER CO. This was a suit relating to a patent for a corrugated hose, the corrugations of which appear to have been of structural value, in that they strengthened the hose against lateral strain and increased its wear. After the expiration of the patent, in 1889, the plaintiff continued for some years to be the only manufacturer of hose displaying these corrugations. Upon this sole ground, the plaintiff claimed that it thereby acquired an exclusive right to manufacture hose in that form, the form having become distinctive of its goods. The court said that, if this were the law, it would follow that the patentee, after the expiration of his patent, had he been the only maker of this hose for some years following, could, by his own act, turn his patent, which the law limited to seventeen years, into a perpetual one, and rejected the plaintiff's application as an unwarranted extension of the monopoly previously enjoyed under the patent. [The Federal Reporter, Vol. 231, page 827.]

DE LASKI & THROPP CIRCULAR WOVEN TIRE CO. AND OTHERS V. UNITED STATES TIRE CO. The De Laski v. Thropp patent, No. 1,011,450, for a tire wrapping machine was held void for prior use by others. [The Federal Reporter, Vol. 232, page 884.]

TENSILE STRENGTH CALCULATOR.

A **CLEVER** device to assist in calculating the tensile strength of rubber has been recently designed and copyrighted by Philip E. Young, New Bedford, Massachusetts. The "Tensile Calculator," as it is called, is really a modified form of the slide rule, and, as shown in the accompanying illustration, is extremely simple both in construction and operation. It comprises a circular disk of white celluloid, on which is superposed one of lesser diameter and transparent, serving as a support for the annular transparent disk that revolves around it.



The inner superposed disk, being transparent, shows graduations from 15 to 150, representing the pull of the testing machine in pounds. The annular revolving disk shows graduations from

.035 to .350 that represent the thickness of the test piece in decimals of an inch. Coincident with the outer edge of the revolving disk and marked on the larger disk are graduations from 300 to 3,000, representing the tensile strength in pounds.

Knowing the thickness of the test piece and the pull of the testing machine in pounds, the reading for tensile strength is readily obtained by the following directions that are printed on the reverse of the calculator. These read: "Turn the transparent disk so that the thickness of the sample coincides with the pull obtained on the testing machine. On the outer scale, opposite the width of the sample, read the tensile strength."

The Philadelphia Rubber Works Co., Philadelphia, Pennsylv-

ania, has ordered a supply of these calculators which they will send gratis to the rubber consuming trade upon receipt of a written request.

RUBBER TRADE INQUIRIES.

THE inquiries that follow have already been answered, nevertheless they are of interest, not only in showing the needs of the trade, but because of the possibility that additional information may be furnished by those who read them. The editor is therefore glad to have those interested communicate with him.

[228.] A correspondent wishes to secure a second-hand tubing machine.

[229.] We are in receipt of two inquiries for rubber band cutting machines.

[230.] Names of manufacturers of dolls, balls and other toys made of rubber have been requested.

[231.] Names of vulcanizing accelerators and dealers in same have been requested.

[232.] A correspondent asks who manufactures a machine for making bundles of automobile casings, several tires to a bundle.

[233.] We have been asked where pure gum tape may be obtained and what concerns manufacture a machine to apply such tape on wire or similar substances.

[234.] Lists of manufacturers of electricians' gloves and of sponge rubber have been requested.

[235.] Manufacturers of laundry machinery such as washing machines, centrifugal driers, mangles, etc., are sought by a rubber manufacturer.

[236.] A rubber company wishes to know where flux may be obtained.

TRADE OPPORTUNITIES FROM CONSULAR REPORTS.

A firm in Cuba wishes to receive names and addresses of American manufacturers of machinery to be used in making automobile and bicycle tires and other rubber articles. Report No. 22,470.

A firm in Spain desires to import rubber packing. Report No. 22,471.

There is a market in Venezuela for all kinds of elastic products, such as suspenders, garters, belts, etc. Report No. 22,478.

A business man in Spain desires quotations on tennis balls. Report No. 22,523.

A New Zealand business man, now in the United States, wishes to be placed in touch with manufacturers of rubber, rubber dam and other dental supplies. Report No. 22,563.

An export house on the Pacific Coast has received orders from the Orient for elastic webbing. Report No. 22,642.

Representation of American manufacturers of machinery for rolling and working raw rubber, for laying prepared rubber around wires, and for stranding and braiding vulcanized rubber wires and cables is desired by a business man in Denmark. Report No. 22,663.

A commission agent in Holland desires to represent American manufacturers of rubber goods. Report No. 22,677.

A firm in Colombia is in the market for articles made of rubber. Report No. 22,681.

Inquiries have been received from Russia by an export house on the Pacific Coast, for rubber erasers. Report No. 22,721.

An inquirer in the Far East wishes to communicate with American manufacturers of elastic webbing. Report No. 22,730.

A firm in Greece wishes to import elastic for garters. Report No. 22,771.

The Bureau of Supplies and Accounts, Navy Department, Washington, D. C., seeks bids on 500 feet of suction rubber hose.

New Goods and Specialties.

THE "DOVER" RAINCOAT.

FOLLOWING upon several years' experimentation in perfecting a black surface proofing for raincoats, the model here illustrated is being placed on the market. The special feature of this waterproof fabric is its light weight—a 52-inch length coat not exceeding $2\frac{1}{4}$ pounds. The cut of this garment shows its close conformity to present feminine style tendencies.

To complete the outfit, a hood of the same material, called the "Peggy" is also being manufactured. It is loose lined with silk, and is particularly well adapted for motoring, yachting or evening wear.

The new proofing is applicable to silk, fine cambric, and to wool or cotton cantons. [Canadian Consolidated Rubber Co., Limited, Montreal, Canada.]



ELECTRIC LAMP CHANGER WITH RUBBER FINGERS.

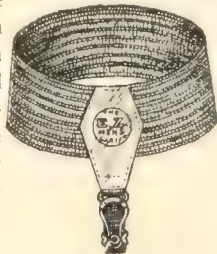
A device which greatly simplifies the operation of renewing burnt out bulbs in high theatre and hotel canopies and other inaccessible stationary sockets consists of three sleeves carrying a set of metal tongues which are bent to the shape of a bulb and covered with rubber protectors for nearly their entire length. The two end sleeves slide within the middle one. The lower sleeve is fixed on the end of a bamboo or steel pole by means of a spread cotter-pin. The lower ends of the tongues are joined to a disk held in the upper sleeve and joined to the fixed bottom sleeve by means of a coil spring, which acts as a universal joint.



The operation is simple. The pole is lifted so that the rubber-covered tongues slip over the bulb. These are adjustable to various sizes of bulbs. The rubber serves as a cushion, and also as a friction, so that by twisting the pole, the lamp is unscrewed from its socket. The new bulb is placed by a reverse operation. [McGill Manufacturing Co., Valparaiso, Indiana.]

"E. Z." GARTER WITH WIDE ELASTIC.

With many styles of garters a man takes his choice of two disagreeable sensations, due to the manner of adjustment—wrinkled socks, or a tightness about the leg which interferes with the circulation and is frequently the cause of foot trouble. In the "E. Z." garter, an exceptionally wide elastic is used, which is in itself an advantage as it does not bind the leg as would a narrow band. Everlastik, Inc., Boston, Massachusetts, is the maker of this elastic, which is specially woven with a view of softness and pliability, and shapes itself to the leg without adjustments. It is of featherweight consistency and permits ventilation. The garter clasp is attached to the elastic by a double strip of soft, smooth leather and no metal part touches the wearer's leg. This clasp fits over an anti-friction rubber-covered post or button, which holds the sock. It is claimed by the manufacturer that the regular size will fit 80 men out of 100, while a large size is furnished for men whose



legs measure more than 14 inches at the calf. [The Thos. P. Taylor Co., Bridgeport, Conn.]

SHAMPOO APRON.

The shampoo apron here illustrated is an exceptionally well appearing utility garment for protecting the clothing while washing the hair. It is made of fine rubberized fabric, shaped to cover the back and shoulders and leaving the arms free. The edges are neatly bound, and the apron fastens at the sides and neck by means of narrow ribbons run through metal eyelets, forming a trim and serviceable article. [Ernest Dudley Chase, Boston, Massachusetts.]



"PITCH EM," A RUBBER HORSESHOE GAME.

Throwing horseshoes over a stake set up in the back yard was a favorite pastime of our forefathers. The iron horseshoes, however, were heavy and cumbersome, suited only to the hand of an adult. In "Pitch Em," rubber horseshoes with a steel stiffening core make possible the indulgence of this popular and ancient sport within doors, the necessary peg being embedded in a metal disk. The game affords opportunity for the cultivation of skill and accuracy appealing to adults, and, as the horseshoes are light in weight and incapable of injuring the furniture if thrown wildly, it is also suitable and amusing for children. [Walbert Manufacturing Co., Chicago, Illinois.]



RUBBER DISKS IN CHILDREN'S SHOES.

Many shoes for children are made with stiff soles; and, further, many of these soles are so polished and slippery that they deter children from learning to walk. While rubber disks in shoe soles are not new, their application to children's shoes, to prevent the wearers from slipping, is a new application. The shoe shown here has three disks of rubber-coated canvas set in the heels and five similar disks in the forepart of the sole, these being the principal wearing points in walking. They wear down even with the level of the soles, but prevent slipping. [Little Chick Shoe Co., Chicago, Illinois.]



"RESISTOIL" AIR HOSE.

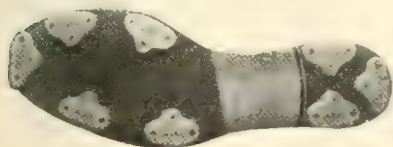
Ordinary hose, as used in garages, gets hard usage and little care. Because of this, and often from inherent weakness, it gives but comparatively short service. After years of unpleasant experience an air hose manufacturer claims to have discovered that the primary source of trouble lay in the inner tube. The oil that necessarily works its way into the hose eats through the inner tube. The air follows the perforation, working up and down the length of hose and leaking through the plies of cloth and rubber until it finds an outlet through the outside covering. Garage men then wind tape around the leaky place, while the air runs along under this patch until it finds another weak spot where it bursts out again.



Acting upon this knowledge, an oil-proof inner tube, the "Resistoil," shown in the accompanying illustration, was evolved. [Brunner Manufacturing Co., Utica, New York.]

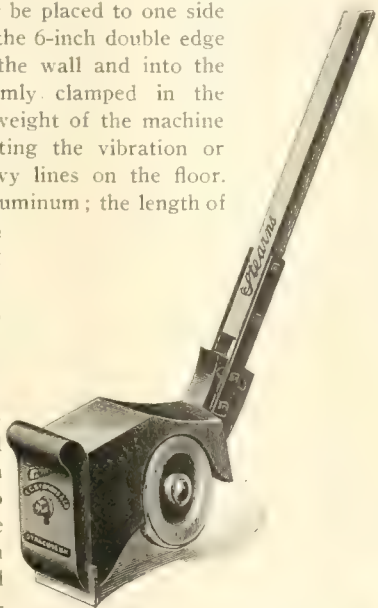
AVON SPORTING BOOT STUDS.

For golfers, hockey players, and many outdoor workers, a shoe that firmly grips the turf is a prime necessity. The hob-nails frequently used for this purpose being heavy and cumbersome, are liable to blister the feet in summer and to make holes which cause wet, cold feet in winter. In the accompanying illustration a new design in rubber studs is shown, these studs being placed at regular intervals around the edge of the sole and heel. The manufacturer claims that by their use coolness in summer is obtained; also, dry warmth in winter, a thorough grip under all conditions, and exceptional wearing quality. Sets of large studs for men's, and small studs for women's boots are supplied in neat boxes, with nails for attaching them to the shoes. [The Avon India Rubber Co., Limited, Melksham, England.]



FLOOR SCRAPER WITH RUBBER TIRES.

Here is a floor scraper whose 5-inch wheels are equipped with rubber tires, thus avoiding all injury to the floor while in use. This No. 10 model is intended for scraping large surfaces. The adjustable cross handle may be placed to one side or the other, thus allowing the 6-inch double edge knife to be worked up to the wall and into the corners. The knife is firmly clamped in the scraper and nearly all the weight of the machine rests on the knife, preventing the vibration or "chatter" which causes wavy lines on the floor. The scraper is finished in aluminum; the length of handle and braces is 38½ inches, and the shipping weight, 135 pounds. [E. C. Stearns & Co., Syracuse, New York.]



TOY WITH RUBBER CORDS.

Toys whose pleasing absurdity, gay coloring and elastic power of motion would commend them to any child, are the duck-like figures of wood, colored in red, yellow, white and blue, in feminine or masculine guise, called the "Quacky Doodles" "Dandy Daddles" family. Their animated movements, which afford never-ending amusement for the little ones, are effected by the long jointed neck and strong rubber cord used in holding the head and neck together. The jointed neck is patented and operates on the ball and socket principle. The legs are also held to the body by elastic cords, permitting free movement. These toys were designed by Johnny Gruelle, a well-known artist. Their subtly humorous quality is appreciated by adults as well as children, and they are largely used as place cards. [P. F. Volland & Co., Chicago, Illinois.]

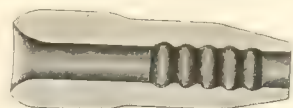
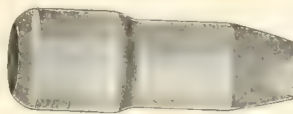
ANTI-JAR SOCKETS FOR UMBRELLAS.

On the theory that every silencer and shock absorber is a benefit, the no-jar principle is now applied to umbrellas. A socket of sheet metal is made to fit over the tip of the umbrella. This is covered with a piece of rubber tubing, and at the end

by a disk of rubber. When this protector is slipped over the tip or point of the umbrella it acts as does an elastic tip on a cane, absorbing the shock, preventing the slip, and quieting the noise. [Patterson Brothers, New York City.]

GAS TIGHT END FOR TUBING.

The use of rubber tubing for conveying gas from the household burner tip, or from special nozzles adapted for the purpose, is, to a greater or less extent, subject to leakage from imperfect connection. A rubber gas end is now manufactured which has an inside thread, or a series of annular ridges, which are sufficiently elastic to slip over the jet or nozzle, and to insure a gas-tight connection. The illustration shows the appearance of this useful accessory, while the sectional view gives details of its construction.



[Durst Manufacturing Co., Inc., New York City.]

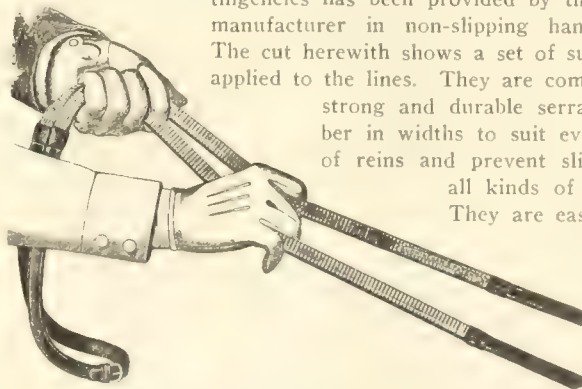
RIBBED FORCE CUP.

The rubber force cup here shown is designed to secure with less material a cup as strong and efficient in all respects as the standard force cup. By means of longitudinal ribs in the side walls, the weight of the cup is lightened, while at the same time its suction power is increased, and it is claimed that the saving in weight is added to the quality of material. An increase in weight of the lower or working portion of the cup and a decrease in the upper portion holding the wood handle, adds still further to its effectiveness. The result is a light, strong, quick-acting cup, whose improved quality and utility is generally recognized by the plumbing trade. [Dryden Rubber Co., Chicago, Illinois.]



NON-SLIDE HAND HOLDS.

Many distressing accidents have been caused by the slipping of reins through the hands. But insurance against such contingencies has been provided by the rubber manufacturer in non-slipping hand holds. The cut herewith shows a set of such holds applied to the lines. They are composed of strong and durable serrated rubber in widths to suit every class of reins and prevent slipping in all kinds of weather. They are easy of ad-

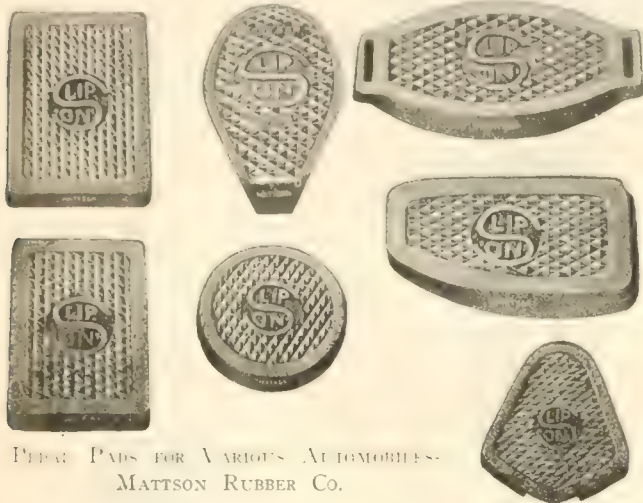


justment and, besides their interest for riders and drivers generally, the fact that they make possible a perfect grip with one hand gives them a special value to those devoted to polo, steeple chasing and hunting. [C. W. Moseman & Bro., Walsall, England.]

AUTOMOBILE PEDAL PADS.

THE metallic control pedals of automobiles, however deeply grooved, corrugated or otherwise roughened, very rapidly wear smooth and slippery, because the necessity of providing a pedal that will not cause too great fatigue to the foot prevents the use of extra hard steel in these attachments.

These control pedals should always be ready for instant action. The slipping of the driver's foot from a pedal would mean momentary loss of control which might result in a serious acci-



PEDAL PADS FOR VARIOUS AUTOMOBILES—
MATTSON RUBBER CO.

dent, and automobilists long ago recognized the desirability of equipping their control pedals with some slip-proof device. Wood was tried and found of little value; some use insulating tape. But live, resilient, vulcanized rubber remains the only ideal, positive safeguard against foot slipping on automobile control pedals, and many different designs of rubber pedal pads have been placed upon the market.

The element of safety which these rubber pedal pads insure is not their only advantage. They relieve the muscle tension caused by constant pressure of the driver's feet, especially harmful in heavy city traffic; they save shoe leather from excessive wear; and they also act as insulators, protecting the driver's feet from the heat that constantly radiates from the motor to the control pedals and other metallic parts of the car.

The rubber pad, of course, must be detachable, in order that it may be really renewed. In some models, an adhesive lip attaches the pad underneath the pedal, but this method does not always prove satisfactory, especially with hard usage, and improvements are constantly being devised in the way of special

tured by the Mattson Rubber Co., Lodi, New Jersey, for different makes of cars, is shown herewith; also, the pedal pad of the



PEDAL MAT—
EMIL GROSSMAN
MAN MFG. CO.

Mechanical Rubber Co., Cleveland, Ohio, which has an indented rubber surface and metal strips for attachment to the pedal; the adjustable "Never-slip Auto-Pedal" designed for all makes of cars by the Geo. H. Rives Manufacturing Co., New York City; four models of the steel-framed, corrugated rubber pedal pads of the



BACK VIEW OF
GROSSMAN PEDAL.

Auto Pedal Pad Co., Inc., New York City; and two views of the pedal mat of the Emil Grossman Manufacturing Co., Inc., Brooklyn, New York, showing the rubber grip surface and a view of the back, showing the method of fastening.

CORRUGATED FINGER PAD.

Fingertips of rubber are used by cashiers, bank tellers and others who are obliged to handle paper money, and by those who are required to count sheets of paper, or for similar manipulation.



A tip or pad with perforations to allow ventilation, and which also has ribs or corrugations forming a non-slip feature which facilitates lifting one and only one sheet or bill at a time, is called the "Marsh" hygienic finger pad, which is claimed to be the only patented device of its kind [Davol Rubber Co., Providence, Rhode Island.]

ADVANCE IN TENNIS SHOES.

As was reported in THE INDIA RUBBER WORLD last month, the United States Rubber Co. sent out a new price list of tennis footwear lines on September 1. This price list, as usual, was "subject to change without notice." This was certainly not a meaningless phrase, for the last of September the customers of the company were notified of an advance, amounting to from 3 to 5 cents per pair on Vim Bals and Oxfords. The changes were as follows:

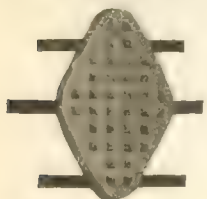
	PAIRS		ONE PRS.	
	Sept. 1	Sept. 26	Sept. 1	Sept. 26
Men's Vim...	53 cents	57 cents	43 cents	47 cents
Men's Vim...	50 "	55 "	40 "	45 "
Women's Vim...	49 "	53 "	39 "	43 "
Women's Vim...	54 "	58 "	40 "	44 "
Misses' Vim...	48 "	52 "	38 "	42 "
Children's Vim...	45 "	48 "	35 "	38 "

Prices are the same in individual cartons or in bulk; 24 pairs to the case.

No changes were indicated in the other tennis lines, or "Keds," as they are now designated.

The Year Book of the National Fire Protection Association is at hand. It gives the articles of association, the officers and committees, and a full list of associate members. The latter list contains about 3,000 names, of which perhaps 10 per cent are Canadian firms and individuals. Among these, the rubber trade is fairly well represented. In addition to this are a number of members in various countries of Europe, Australasia, Africa and Eastern Asia.

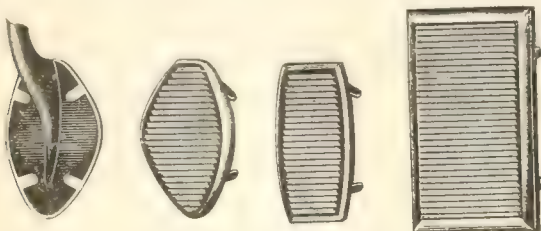
The exhibit of the Mishawaka Woolen Manufacturing Co., Mishawaka, Indiana, at the recent Inter-State Fair held at Springbrook Park in South Bend, Indiana, was unanimously voted the best at the fair, as the company had a man at work all the time making boots.



PEDAL PAD—ME-
CHANICAL RUBBER
Co.

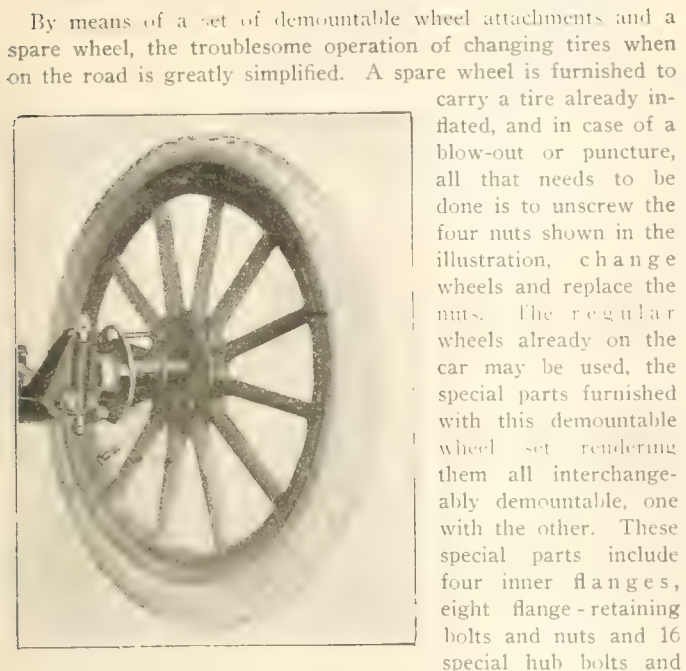


NEVER-SLIP
ADJUSTABLE
AUTO PEDAL
—GEO. H.
RIVES CO.



STEEL FRAMED RUBBER PADS—AUTO PEDAL PAD CO., INC.

clamps and steel frames which join the rubber pad to the metal pedal so firmly that it cannot slip off nor shift in the slightest degree. A group of the various types of pedal pads manufac-

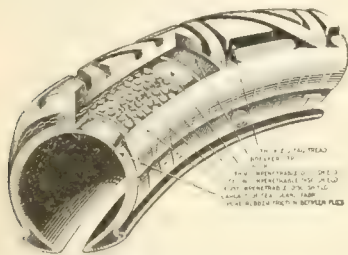
STANDARD DEMOUNTABLE WHEEL SET FOR FORD CARS.

By means of a set of demountable wheel attachments and a spare wheel, the troublesome operation of changing tires when on the road is greatly simplified. A spare wheel is furnished to carry a tire already inflated, and in case of a blow-out or puncture, all that needs to be done is to unscrew the four nuts shown in the illustration, change wheels and replace the nuts. The regular wheels already on the car may be used, the special parts furnished with this demountable wheel set rendering them all interchangeably demountable, one with the other. These special parts include four inner flanges, eight flange-retaining bolts and nuts and 16 special hub bolts and

nuts. One inner flange and two bolts are used to equip each wheel, while four special hub bolts and nuts should be mounted on each hub. The nuts are of fine hardened steel, rust proof and insensible to damage through severe use. The special bolts are manufactured from high carbon steel of great tensile and torsional strength and are claimed to have a capacity 300 per cent greater than that of ordinary carriage bolts. [The Standard Auto Accessory Co., Leipsic, Ohio.]

THE LEE PUNCTURE-PROOF GUARANTEED TIRE.

The users of Lee tires are provided with double assurance while motoring, one being a puncture-proof guarantee and the other a guarantee for 5,000 miles. The evils of puncture include roadside delays, discomfort and expense, all of which are usually collated in two fearsome words, "tire troubles."



Ordinary pneumatic tires are at the mercy of nails, glass and sharp stones that persistently find their way in the path of all motorists one day or the other. Chance only decides how soon the best car and the most careful

driver will meet with puncture disaster.

In the Lee tires, three separate layers of small puncture-proof disks are embedded in the rubber of the cushion that lies between the carcass and the breaker strip, forming a flexible armor of mail. It will be seen by referring to the illustration that while these disks overlap they do not touch each other, thereby avoiding the danger of friction and consequent heating. The carcass and tube are thereby protected and it is claimed that resiliency and wearing quality are increased by a special rubber compound and curing process. [Lee Tire & Rubber Co., Conshohocken, Pennsylvania.]

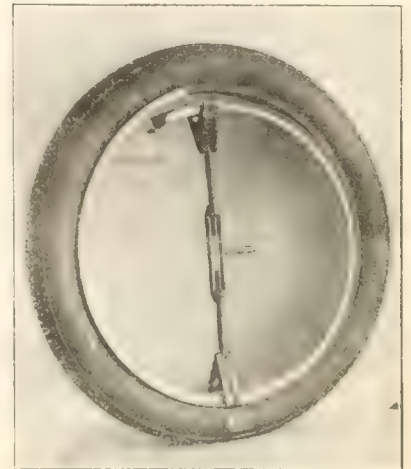
S. A. E. TIRE DIVISION RECOMMENDATIONS.

At the meeting of the Society of Automobile Engineers, held October 18 at the Bureau of Standards, Washington, D. C., the tire division recommended straight side tires from 32 by 3½ to 36 by 4½, as the larger straight sides are not practical. This recommendation was amended with a provision that straight sides be of the wide standard. The report was adopted.

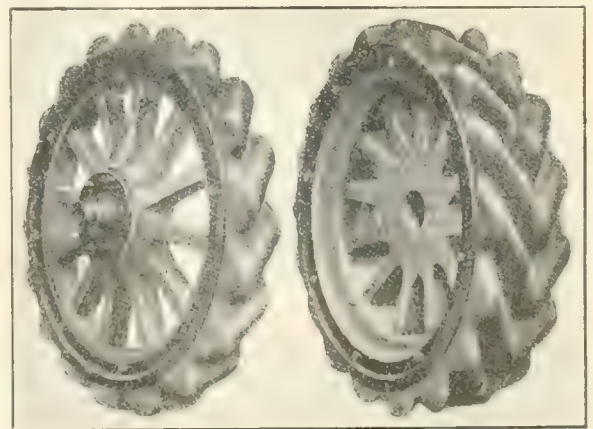
THE BURRILL TIRE TOOL.

Split demountable rims require something more than ordinary tools to satisfactorily remove them from the tire. The utility of such a device consists, first of all, in compactness and simplicity of construction, then facility in applying it to the rim and an easy method of exerting in an even manner the force necessary to remove the rim.

As shown in the illustration, the two grips are hinged to the right and left-hand screw bolts that form part of what is known as an ordinary turnbuckle. The grips are slipped over the rim and with a few turns of the handle that is attached to the turnbuckle, the rim is sprung away from the tire without distortion, and easily removed. In applying the rim to a tire, the tool is attached in the manner previously described and the rim bent slightly downward, when it can then be sprung in place. [The Burrill Tire Tool Co., Concord Junction, Massachusetts.]

**MOTOR FIRE ENGINE TIRES.**

Tires for motor fire engines present some problems other than those common to motor truck or automobile tires. These engines have the weight and bulk of motor trucks, but require to



CROSS RIB TIRES FOR MOTOR ENGINES.

be driven at the speed of the motor car. The main problem is to prevent skidding, and two special tires which are pronounced peculiarly efficacious for this purpose are shown in the illustration. One of these shows parallel ribs diagonal to the rim. The other shows two sets of such ribs, at opposite angles, the tread being twice as broad. [The Shrewsbury & Calliner Tire Co., Limited, Ardwick Green, Manchester, England.]

THE UNITED STATES CIVIL SERVICE COMMISSION, WASHINGTON, D. C., announces an open competitive examination for expert electrical and mechanical aid to fill a vacancy in the Bureau of Yards and Docks, Navy Department, and vacancies which may occur in positions requiring similar qualifications. Applications must be filed with the Commission at the above address before November 14.

Rubber-Soled Footwear for Indoor Sports.

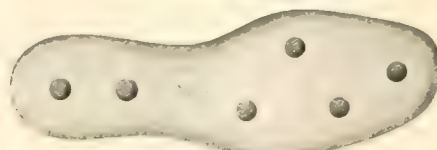
NOW is the season when devotees of athletics transfer most of their activities to the gymnasium, and, therefore, shoes adapted specially for such use are in demand. The manufacturers have not been backward in furnishing suitable footwear for this purpose, giving special attention to the re-

this sole has a wide edge, inside of which is a collection of square, convex sections, each having a vacuum cup in its center.

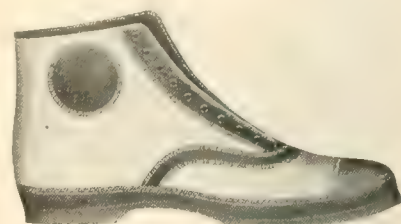
Another form of elaborate sole is shown by the Converse Rubber Shoe Co., Malden, Massachusetts, which contains, in-



BASKET BALL "KED"
UNITED STATES RUBBER CO.



BASKET BALL SHOE
LA CROSSE RUBBER MILLS CO.



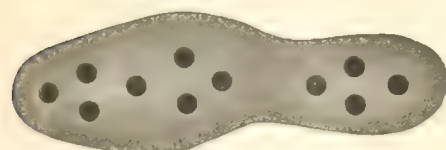
"KING PIN" BASKET BALL SHOE
CONVERSE RUBBER SHOE CO.

quirements of the various uses to which it is to be put in the various games.

Just at present there is a greater demand for basket-ball shoes than any other line of this kind, though it is safe to assume that many shoes made expressly for this game are used in bowling, fencing, and other athletic sports. The principal requirements of basket-ball shoes are that they shall be strong

side of the broad edge, a depressed section composed of square spaces divided from each other by diagonal ridges and, in addition to these, the sections at the inside edge of the tread, both sole and heel, have further walls or longitudinal divisions.

Of the designs of the uppers of these shoes, the illustrations are sufficiently clear to require but little description. It will be noticed that they vary as regards the design at the toe, some



"CENTURY" BASKET BALL SHOE
APSLEY RUBBER CO.



BASKET BALL SHOE
APSLEY RUBBER CO.



"GRID SURE" BASKET BALL SHOE
BEACON FALLS RUBBER SHOE CO.

and able to withstand the hard service to which they are subjected without ripping or tearing.

Another, and perhaps the principal requirement, however, is that they should have a non-slipping quality, that they should cling to the floor, which is usually highly polished, and on which ordinary footwear would render its use dangerous to the point of impossibility.

As a rule, manufacturers use the vacuum principle in the soles provided for this purpose, and several patterns are shown as used by different manufacturers. As is shown below, the Beacon Falls Rubber Shoe Co., Beacon Falls, Connecticut, gets out a special basket-ball shoe, leather-trimmed, with a suction cup sole of red rubber. As will be readily noted,

showing leather caps, while others simply increase the width of the foxing, as shown in the shoe made by the La Crosse Rubber Mills Co., La Crosse, Wisconsin. Some of these shoes also have leather patches as extra protection to the ankle bones.

Attention might be called to the peculiarity of the sole of the shoe manufactured by the United States Rubber Co., New York City, the tread of the sole being beveled outward, the edge being cut at an angle, this of itself giving a clinging quality appreciated by basket-ball players.

These, of course, are only a few of the many lines manufactured for this or similar purposes, but it will serve to give readers an idea of the leading features of this special kind of footwear.

The Obituary Record.

AN AUTHORITY ON PLANTATION RUBBER.

CHARLES Arthur Lampard, whose death is chronicled in the English press, was one of the best known men in the rubber plantation industry of the Far East. Starting in business with a tea importing house in London, he later connected himself with the important firm of Harrisons & Crosfield, Limited, devoting



C. A. LAMPARD.

his attention to their foreign business. He made frequent visits to the various countries of Europe and to America, and in 1895 went to the Far East, establishing houses in Ceylon, India, the Federated Malay States, Sumatra and Java.

Early appreciating the importance of the plantation industry, he devoted his attention mainly to this branch. He became chairman of the Rubber Plantations Investment Trust, Limited, and at the time of his death was a director in no less than 29 of

the most successful rubber companies. It is stated that the association of his name with any new venture connected with the rubber plantation industry was a guarantee of soundness and that his unflinching optimism was a valuable asset to the industry during that period of doubt and difficulty which followed the collapse of the first wild boom. In his position as chairman of the Rubber Plantations Investment Trust, Limited, his addresses at the opening of the annual meetings were quoted far and wide, and many of his estimates and predictions as to the future of plantation rubber were subsequently verified with remarkable accuracy.

Mr. Lampard was not a believer in the practicability of the commercial production of synthetic rubber. He was one of the first to urge the advisability of forward rubber contracts and he foresaw the present situation of American consumers buying rubber in the East and shipping direct, thus eliminating the added expense of doing business through London.

Although still comparatively young, since the loss of a son in the present war Mr. Lampard's health had steadily declined, and in the early part of this year he relinquished his directorship of Harrisons & Crosfield and gradually curtailed his activities in other directions and practically retired to his estate in Home Park, Rotherfield, Sussex, where his death occurred as above stated. Mr. Lampard was one of the keenest and most far-sighted men of the rubber planting world in London, and by his death the trade loses one of its leaders and most striking personalities.

HANDLED TIRE FABRICS.

W. H. Tobey, Chicago manager, and director of J. H. Lane & Co., well known in the rubber trade, died in that city on October 3, after a long period of illness. He was about 44 years of age, and had been connected with J. H. Lane & Co. for the

last 23 years. He was held in high esteem by his business associates and by all with whom he came in contact.

WELL-KNOWN WASTE MATERIAL MAN.

M. Kaufman, head of the waste material house of that name in Chicago, Illinois, died in that city late in September, aged 77 years. Mr. Kaufman had been in the waste material business in Chicago since 1866, but during the past 10 years had not been active in the management of the business. He was highly esteemed by many in his own and other lines of business.

INVENTOR OF LIQUID INSULATION.

Henry Splitdorf, whose name is associated with Morse, Clark and Edison as inventor of important electrical devices, died in New York City on October 16, in the eighty-third year of his age. Mr. Splitdorf



HENRY SPLITDORF.

was born in Germany, came to this country at the age of 14 years, and was apprenticed to the machinist's trade. Later he entered the electrical business. Although he had but a common school education, by assiduous and concentrated study of electrical matters he became an expert and many of his inventions were of great importance in the fields of electricity and telegraphy. Of especial interest is the fact that he was associated with Samuel F. B. Morse in the development of telegraphic apparatus and in connection

with Clark he developed the Clark repeater, which made it possible for Thomas A. Edison to invent the multiple system of telegraphy, and at the time of his death Mr. Splitdorf had been working upon a storage battery which, however, had not been perfected. It was he who introduced asbestos as an insulating material and he was the inventor of liquid insulation of magnetic wire which has practically replaced the more expensive silk insulation used previously. It is through this invention very largely that present perfection in insulated wire has been attained.

Mr. Splitdorf was a constant attendant at St. Peter's Episcopal Church at Westchester, New York. Until old age overtook him he was a member of the Arion Club and the Liederkranz. He leaves two married daughters and two sons, one of whom, Charles Splitdorf, is vice-president of the Splitdorf Electrical Co., of Newark, New Jersey.

A POPULAR PURCHASING AGENT.

Nelson W. Sayles, purchasing agent of the Republic Rubber Co., Youngstown, Ohio, died in New York City October 14. He had been in declining health for a number of months. While

on a vacation he became critically ill, and six weeks later succumbed. Mr. Sayles was a graduate of Yale University. He entered the accounting department of the Republic Rubber Co. in 1910, and a year later was made purchasing agent. In business and in social circles he was universally esteemed, and by his kindness and genial spirit won many friends who deeply deplore his death.

A VETERAN IN RUBBER TIRE INDUSTRY.

George D. Edwards, manager of the Detroit (Michigan) branch of the Kelly-Springfield Tire Co., Akron, Ohio, died in Detroit, October 4. Mr. Edwards had been in the tire business over 20 years, dating back to his connection with the Rubber Tire & Wheel Co., the predecessor of the Kelly-Springfield company.

EXPERT IN TIRE MANUFACTURE.

Grover I. Myers, head of the pneumatic tire department of the Firestone Tire & Rubber Co., Akron, O., died as the result of an automobile accident last August.

CANADIAN CONSOLIDATED EMPLOYEES.

The executives of the Canadian Consolidated Rubber Co., Limited, Montreal, Canada, have instituted an employees' thrift plan to encourage money-saving among the employees of the company. This plan gives any employee the privilege of placing with the company any portion of his or her wages or salary which can be readily spared, for which the company will allow interest, to be added monthly. When the amount reaches \$100 or more it may, upon request, be used for investing in government bonds or other securities, the company giving every assistance in making this investment. It is thought that this will be of real practical benefit to the employees and that those who avail themselves of this privilege will be better employees for the company and thus render the benefit mutual. It will be interesting to see how many employees will avail themselves of this practical opportunity.

RUBBER SALESMAN IMPRISONED IN FRANCE.

News has been received from Paris, France, that William C. Silberman, of New York City, was sentenced by the Correctional Court to five years in prison and a fine of 500 francs, under a charge of trading with the enemy. It is claimed that Mr. Silberman came to Paris with papers describing him as a representative of the King Rubber Co., of Hyde Park, Boston, Massachusetts, and on the strength of these papers he obtained several important orders, but was finally denounced by a Serbian who had known him in New York, and who said that he was acting for Gottwik, Scheffer & Co., dealers in druggists' sundries in New York City. The senior member of the latter firm states that Mr. Silberman was never in its employ, and it was learned from Maurice D. Kingsbury, manager of the King Rubber Co., that Gottwik, Scheffer & Co. are the selling agents in New York City for the King Rubber Co., and that this firm recommended Silberman as a good man to represent the rubber company abroad and to handle sales of rubber gloves, etc., made by the King company, to the English and French military forces. Mr. Kingsbury is also reported to have said that, although Mr. Silberman went abroad some time last March he had made no report of sales nor had he drawn any money on account of the King Rubber Co. The case has been placed in the hands of the State Department at Washington.

The State of Missouri probably produces more barytes than any other in the Union. During 1915, barytes producers in this state marketed 40,000 tons. This substance is extensively used in rubber compounding.

ANNUAL REPORT OF THE INTERCONTINENTAL RUBBER CO.

AT THE annual meeting of the Intercontinental Rubber Co., Jersey City, New Jersey, held October 2, Secretary Willard P. Smith, in his annual report covering the year ending July 31, 1916, states that:

Conditions in Mexico have not improved the past year, and have been such that it has not been possible to operate the factory at all since the month of August, 1915. The prevailing prices for rubber have been low, but a reasonable profit has been realized from the sale of the stock remaining on hand at the time of shutdown.

Conditions on the Cedros Ranch likewise continued to be such that it has not been possible to round up the stock, nor to make any physical inventories. Gathering of guayule shrub, from which the rubber is extracted, has also been entirely stopped.

It has been possible to hold a meeting of the Directors of the Compania Ganadera y Textil de Cedros, S. A., which owns the ranch, and a small dividend from the prior earnings of that company was transferred to the income of the Intercontinental Rubber Company. The losses at the ranch from revolutionary disturbances, however, have seriously reduced the profits derived from former operations.

The balance sheet, which is reprinted below, shows net profits and income from investments amounting to nearly \$540,000, as compared with \$240,000 for the preceding year, and the surplus last July was nearly \$523,000 larger than the same time the year before.

BALANCE SHEET—JULY 31, 1916.

ASSETS.			
Investments in stock:			
Merged and subsidiary Companies			
By Cash	\$ 2,115,301.59		
By Stock issues	28,198,575.30		
Other Companies	487,970.00	\$30,701,866.89	
Patents, exclusive of subsidiary Companies		15,141.77	
Accounts and Notes Receivable, etc.:			
Advances to subsidiary Companies	\$ 306,020.40		
Sundry accounts	48,897.55	354,917.95	
Investment Securities (market value)		1,231,355.00	
Cash		435,273.84	
		<u>\$32,738,465.45</u>	
LIABILITIES.			
Capital Stock: Common		\$29,031,000.00	
Accounts Payable, Taxes accrued, etc.			
Due to subsidiary Companies	\$ 14,140.04		
Sundry accounts	8,469.70	22,609.74	
Reserve accounts		734,433.71	
Surplus (as below)		2,950,422.00	
		<u>\$32,738,465.45</u>	
SURPLUS, AUGUST 1, 1915.			
Surplus August 1, 1915		\$ 2,427,077.39	
Gross Profits on operations	\$ 42,995.95		
Net Profits and Income from Investments, Interest, etc (after adjustment of investment securities to current market value)	538,906.83		
	\$ 581,902.78		
Less Administration, Taxes, and General Expenses	45,914.32	535,988.46	
		<u>\$ 2,963,065.85</u>	
Charges against Surplus:			
Reserve against loans to subsidiary Companies		12,643.85	
Surplus, July 31, 1916		<u>\$ 2,950,422.00</u>	

At the annual meeting of the board of directors, the following officers were elected: G. H. Carnahan, chairman and president; E. B. Aldrich, vice-president; W. P. Smith, secretary and treasurer.

CONSOLIDATION RUMOR DENIED.

It having been rumored that The B. F. Goodrich Co., Akron, Ohio, had completed plans to take over the Boston Belting Co., President T. A. Forsyth of the latter company states that there is absolutely no foundation for such report; that the Boston Belting Co. has not been sold to any interests, and that there are no negotiations with any party having that end in view.

Rubber Men and Bankers Guests of Colonel Colt.

NEARLY 150 men prominent in financial circles were the guests of Colonel Samuel P. Colt, president of the United States Rubber Co., at his stock farm at Bristol, Rhode Island, on September 30. The invitations read: "To meet the president and directors of the Industrial Trust Co., of Providence, Rhode Island." The program, which was to some extent informal, included a lunch served in a large tent on the lawn opposite the casino, and inspection of the farm, during which there was an exhibition of the milking by an electrically operated device, of fine blooded cattle of pedigreed stock.

At 2 o'clock dinner was served in the casino, both the interior of the building and the spacious veranda being occupied. The interior was tastefully decorated with autumn foliage and with flowers from Colonel Colt's conservatories. A real Rhode Island clam-bake dinner was served which was fully appreciated by all the guests.

Colonel Colt, in opening the more formal exercises, proposed toasts to the President of the United States, R. Livingston Beekman, Governor of Rhode Island, and others. The principal speakers were Governor Beekman, Colonel H. Martin Brown, president of the Industrial Trust Co., of

Providence; Francis L. Hine, president of the First National Bank of New York City; Senator Le Baron B. Colt, William Cameron Forbes, former governor of the Philippine Islands; Colonel Samuel M. Nicholson, vice-president of the Industrial Trust Co., and Howard Elliott, president of the New York, New Haven and Hartford Railroad.

Naturally, most of the addresses treated of the present industrial prosperity of the country and the financial situation, which was well summed up by Senator Colt, who advised bankers to direct their energies to the power of production and the extension of our commerce, both foreign and domestic.

Besides the presidents and directors of many of the leading financial institutions of the country there were a number of guests who are prominent in the rubber trade. Among them were T. H. Rieder, vice-president and general manager, of the Canadian Consolidated Rubber Co., Limited, Montreal, Canada; Roswell C. Colt, assistant secretary, and Victor E. Mitchell, of the same company; E. J. Hathorne, treasurer, Rubber Goods Manufacturing Co., New York City; E. H. Broadwell, vice-president, Fisk Rubber Co., Chicopee Falls, Massachusetts; An-

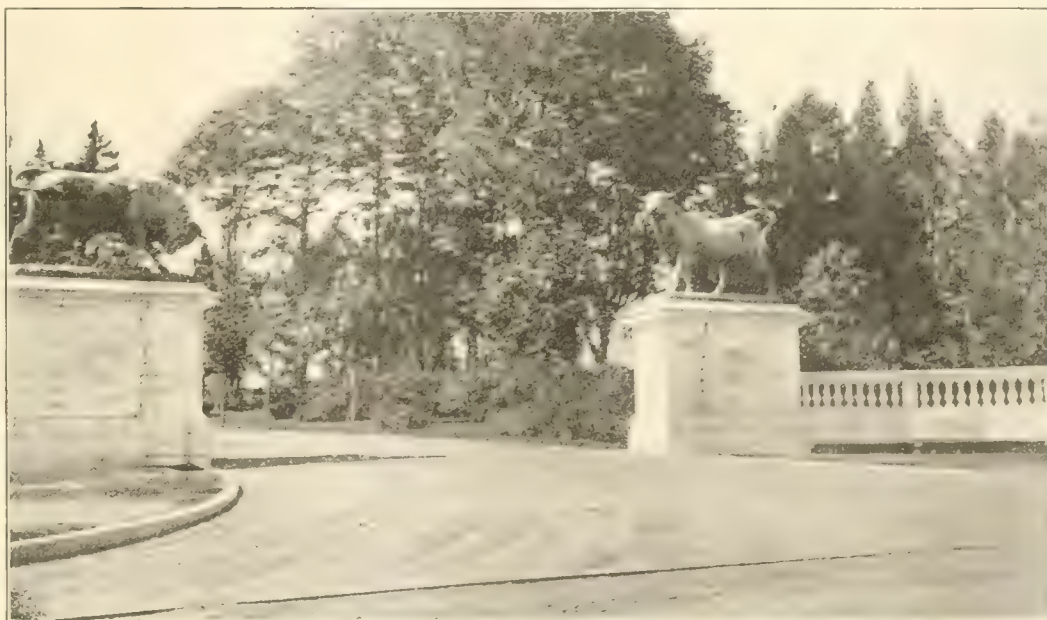
drew W. Anthony, of the National India Rubber Co., Bristol, Rhode Island, and the following officers of the United States Rubber Co.: J. Newton Gunn, vice-president; W. G. Parsons, treasurer; Samuel Norris, secretary; John D. Carberry, assistant secretary; William E. Barker, manager of sales; Walter S. Ballou, Wilson H. Blackwell, Frank W. Roche and others.

An orchestra furnished music during the repast, and the formal exercises were appropriately closed with a rendition of "The End of a Perfect Day."

PRESIDENT BOWERS TO RETIRE.

William F. Bowers, founder and president of the Bowers Rubber Co., San Francisco, California, a pioneer rubber manufacturing concern on the Pacific Slope, having sold his interests, will retire from business. Mr. Bowers has had a most interesting record. He went to California from Lynn, Massa-

chusetts, as a representative of the Gutta Percha & Rubber Manufacturing Co. in the late seventies. In 1882 he formed the Bowers Rubber Co., which was incorporated with a capital of \$300,000, to take over the San Francisco plant of the Gutta Percha & Rubber Manufacturing Co. and engage in making



MAIN ENTRANCE TO COLT FARM. MAGNIFICENT "PRIVATE PROPERTY," WHERE THE PUBLIC IS WELCOME

goods on an independent basis. This was the first company to manufacture rubber goods west of the Rockies on a large scale, and later was the pioneer manufacturer of fabric fire hose on the Coast. The company prospered from the start, and later acquired a plant of about 12 acres in the city of San Francisco. The works built there withstood the shock of the earthquake in 1906, only to be totally destroyed by the fire which followed. A new and more extensive plant was built at Black Diamond, California, and was steadily enlarged as the business grew. For many years this company furnished all the fire hose used in the City of San Francisco, did business all along the Coast and filled several contracts for dredge sleeves and suction hose for the Panama Canal Commission. The company now manufactures a full line of mechanicals and has recently taken on the production of tires and tire tubes.

Mr. Bowers has taken out many patents for hose, hose reels, packing, etc.

He was very highly regarded by all connected with him in business and popular with his employees. So prominent a figure in the Pacific Coast rubber trade will not drop out of it without much regret on the part of all with whom he came in contact.

News of the American Rubber Trade.

SOMERSET RUBBER RECLAIMING WORKS IMPROVEMENTS.

THE Somerset Rubber Reclaiming Works, of New Brunswick, New Jersey, have been making many changes in their factory at East Millstone, adding a number of labor saving devices and machinery to cut down the cost of manufacture, and doubling the producing capacity. A sprinkler system has been installed, the company having joined the Factory Mutual Fire Insurance Cos. For the comfort and convenience of the workmen, shower baths have been installed. The laboratory has been enlarged and equipped with the latest modern apparatus, and a staff of chemists is employed to keep check on the material as it passes through the factory, to assure uniformity of the product. This laboratory is placed at the disposal of the company's customers, expert service being furnished; all such matters of course being treated absolutely confidentially. A specialty of the company is white reclaimed rubber, for which a very large demand is noted. The plant has been working day and night to full capacity.

REINCORPORATES WITH ENLARGED CAPITAL.

The Pennsylvania Rubber Co., Inc., notice of whose incorporation appeared in the September issue of THE INDIA RUBBER WORLD, has been organized with an authorized capital of \$6,000,000, of which \$1,000,000 is 7 per cent cumulative preferred stock and \$5,000,000 is common stock, for the purpose of providing the additional financial requirements necessary to properly handle and care for the increased volume of business of the Pennsylvania Rubber Co. It is asserted that from a volume of trade of less than \$1,000,000 in 1909, the business of the company has developed so that this year it will pass the \$5,000,000 mark. The directors of the new incorporation are as follows: Herbert DuPuy, H. Wilfred DuPuy, C. M. DuPuy, Seneca G. Lewis, George W. Shiveley and George A. McLaughlin.

CAPITAL INCREASE OF FISK RUBBER CO.

At a special meeting of the stockholders of The Fisk Rubber Co., Chicopee Falls, Massachusetts, October 2, mentioned last month, it was voted to authorize an increase in the capital stock of the corporation by \$24,500,000, divided as follows: \$7,500,000 first preferred convertible stock, of which \$5,000,000 will be issued at once; \$5,000,000 second preferred, of which \$2,500,000 will be issued, and \$12,000,000 common stock which will remain in the treasury. The additional issue of second preferred is being taken by the junior security holders, being offered to them on a basis of one share for every four shares of common and second preferred owned in the aggregate. The first preferred has been underwritten by a syndicate headed by Estabrook & Co., Boston, Massachusetts. The new cash is to be used for working capital.

RUBBER COMPANY SHARE QUOTATIONS.

The following market quotations of shares of rubber manufacturing companies on October 25, are furnished by John Burnham & Co., 115 Broadway, New York City, and 41 South La Salle street, Chicago, Illinois:

	Bid.	Asked.
Firestone Tire & Rubber Co., common.....	113 1/2	115 0
Firestone Tire & Rubber Co., preferred.....	110	112 1/2
The B. F. Goodrich Co., common.....	73 1/2	74
The B. F. Goodrich Co., preferred.....	113 1/2	114 1/2
Goodyear Tire & Rubber Co., common.....	295 1/2	298
Goodyear Tire & Rubber Co., preferred.....	108 1/2	109
Kelly-Springfield Tire Co., common.....	77 1/2	78
Kelly-Springfield Tire Co., 1st preferred.....	98	100
Miller Rubber Co., common.....	50	50 1/2
Miller Rubber Co., preferred.....	105	107
Portage Rubber Co., common.....	174	176
Portage Rubber Co., preferred.....	173	174
United States Rubber Co., common.....	66	66 1/2
Swinchart Tire & Rubber Co., common.....	86	92
United States Rubber Co., preferred.....	110	111

METALWOOD MANUFACTURING CO.

Improvements under way for the Metalwood Manufacturing Co., Detroit, Michigan, involve the rebuilding of the central portion of the company's plant, which will give approximately 6,000 square feet of floor space. A 10-ton traveling crane will also be installed, to facilitate handling the work. These improvements are necessitated by the rapid growth of the business, and we are advised that among recent orders of the Metalwood company were repeat orders from the Goodyear Tire & Rubber Co., Akron, Ohio, for Metalwood duplex vulcanizing presses and from Gutta Percha & Rubber, Limited, Toronto, Canada, for Metalwood quick operating remote control type valves.

RUBBER COMPANY DIVIDENDS.

The American Tire Fabric Co. paid a regular quarterly dividend of 1 3/4 per cent on preferred stock on October 2 to stockholders of record September 20.

The Globe Rubber Tire Manufacturing Co. has declared the regular semi-annual dividend of 3 1/2 per cent on the preferred shares, payable November 1, to stockholders of record Oct. 27.

The B. F. Goodrich Co. has declared a dividend of \$1.75 per share on preferred stock, payable January 2, 1917, to stockholders of record December 21, 1916, and a quarterly dividend of \$1 per share on common stock, payable February 15, 1917, to stockholders of record February 2.

The Goodyear Tire & Rubber Co. paid the usual quarterly dividend of 1 3/4 per cent, on October 1 to stockholders of record September 20.

The Hood Rubber Co. paid a bi-monthly dividend of \$1 on common stock on October 14.

The Keystone Tire & Rubber Co. paid a quarterly dividend of 2 per cent and 1/4 per cent additional on its preferred stock and a quarterly dividend of 2 per cent on the common stock, with 3/4 per cent additional, on October 2, to stockholders of record September 8.

A quarterly dividend of 2 per cent was paid by the Miller Rubber Co. on October 20 to stockholders of record October 1.

The New Jersey Zinc Co. has declared a quarterly dividend of 4 per cent, and an extra dividend of 5 per cent, both payable November 10, to stockholders of record October 31.

The Pennsylvania Rubber Co. has declared dividends of 1 3/4 per cent on the preferred stock and 1 1/2 per cent on common stock, payable January 1, 1917.

The Ten Broeck Tyre Co., Louisville, Kentucky, has declared a 4 per cent dividend. This marks the resumption by the company of the payment of dividends which had been interrupted by the outbreak of the war and unsettled business conditions.

The United States Rubber Co. paid a quarterly dividend of 2 per cent on first preferred stock and a quarterly dividend of 1 1/2 per cent on second preferred stock on October 31 to stockholders of record October 14.

The Westinghouse Electric & Manufacturing Co. paid the regular quarterly dividend of 1 3/4 per cent on preferred stock on October 16 and 1 1/2 per cent on common stock October 31, both dividends payable to stockholders of record October 6.

The directors of the Lee Tire & Rubber Corporation have declared a quarterly dividend of 50 cents per share and an extra dividend of 25 cents per share, payable December 1 to stockholders of record November 15.

TRADE NOTES.

The Manhattan Rubber Manufacturing Co., Passaic, New Jersey, has increased its capitalization from \$1,000,000 to \$2,000,000.

The Reading Rubber Manufacturing Co., Reading, Massachusetts, has recently installed a well at its plant which was put down 303 feet, approximately 250 feet of which was through solid rock. The diameter of the well is 8 inches, and it gives a yield of about 70 gallons without lowering the level from the surface greater than 14 feet. A second well is being built by the company, from which equally good results are expected.

F. Bierman & Sons Metal & Rubber Co., St. Louis, Missouri, has a new building ready for occupancy, equipped with facilities which will enable this firm to handle all shipments with more promptness than heretofore. The building is of brick construction, two stories high, 65 by 100 feet in dimensions.

The Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pennsylvania, has sent out a notice that it will redeem at the rate of \$1,050 and accrued and unpaid interest for each bond of \$1,000 face value, all of its convertible sinking fund 5 per cent gold bonds of 1915 issued under the trust indenture dated July 28, 1915, and outstanding on January 1, 1917.

When enlargements now in progress at the Kimmel felt factory at Kitchener (formerly Berlin), Ontario, are completed, all the manufacturing of the Canadian Consolidated Felt Co., Limited, will be done in the Kimmel factory, and the old Berlin felt factory will be used entirely for warehouse purposes.

Additions to present buildings of the Rotch Mills department of the Passaic Cotton Mills at New Bedford, Massachusetts, are almost completed and a new spinning and weaving building is also in course of erection. Taylor, Armitage & Co., Inc., 120 Broadway, New York City, are the selling agents.

The Advance Felt Specialty & Cutting Co., Chicago, Illinois, has recently accomplished its second move within the last 18 months, the changes being due to the rapid growth of the business. In the new quarters at 318-322 South Jefferson street, the company occupies a two-story building of brick construction with full concrete basement, equipped throughout with specially designed machinery for the cutting, stripping and punching of rubber, felt cloth, and analogous materials.

The Armstrong Rubber Co., Inc., Newark, New Jersey, has a plant 75 by 98 feet which has recently installed equipment for the manufacture of regular and molded automobile inner tubes and rubber specialties for the trade, including two 150-horsepower boilers, one 200-horsepower electric generator and an Ingersoll Rand compressor. The calendars and mills are each driven by a separate motor drive, and the plant has an up-to-date Grinnell sprinkler system.

Gutta Percha & Rubber, Limited, Toronto, Canada, has recently purchased the property on which its offices and warehouse are situated in Saskatoon.

The Bibb Manufacturing Co., Macon, Georgia, has increased its capital stock from \$1,500,000 to \$2,500,000 out of accumulated surplus, on account of extensive enlargements at the Columbus factory of the company.

It is proposed to erect 20 dwellings to house the employees of the National Rubber Co., Pottstown, Pennsylvania, and to that end J. C. Feist, of the company, recently purchased a 60-acre tract on the outskirts of that city, the property being a part of the estate of the late Joshua B. Lessig.

The Belmont Packing & Rubber Co. will shortly erect a plant at Butler and Janney streets, Philadelphia, Pennsylvania. The offices of the company are located at 139 North Second street in that city.

The Republic Rubber Co., Youngstown, Ohio, has offered 10,475 shares of its common stock pro rata, at par, to its com-

mon stockholders. The proceeds, about \$1,000,000, will be used for working capital and extensions.

The Milwaukee Engineers' Club, consisting of members of the American Society of Mechanical Engineers, the American Institute of Electrical Engineers, and the American Chemical Society held its first meeting of the season in the new engineering building of the Federal Rubber Co., Cudahy, Wisconsin. A paper on "The Growing and Gathering of Rubber Latex" was read by L. J. D. Healy, chief chemist of that company, and the members, numbering 183, were taken through the factory where the process of manufacture was followed from beginning to end, after which luncheon was served.

PERSONAL MENTION.

Collier W. Baird, treasurer of the Rubber Trading Co., 9-15 Murray street, New York City, and a member of Troop A, First Squadron Cavalry, N. J. N. G., returned last month after a four months' tour of duty at Douglas, Arizona.

Edward Bers, of the firm of E. Bers & Co., Philadelphia, Pennsylvania, dealers in scrap rubber and metals, has been sojourning at French Lick Springs, Indiana, for a brief vacation.

P. W. Day has been appointed sales manager of the F. S. Carr Rubber Co., of Canada, Limited, Granby, Quebec.

Frederick J. Hall, formerly second vice-president of the Habirshaw Wire & Cable Co., that was merged with the Electric Cable Co., is now manager of the cable engineering department of the new company, the Habirshaw Electric Cable Co., Inc., with headquarters at 10 East Forty-third street, New York City.

Michael Minns, for some years identified with the sales department of the B & R Rubber Co., has recently been appointed sales manager of the Quabaug Rubber Co., North Brookfield, Massachusetts, which purchased the business of the former mentioned company.

William L. Wadleigh, head of Wadleigh Co., Limited, Singapore, after a sojourn of five months in the United States, will sail from San Francisco, California, November 11, on the "Tenyo Maru." He expects to arrive in Singapore, December 21.

WINDOW PUBLICITY OF THE UNITED STATES RUBBER CO.

The windows of the United States Rubber Co., in New York City, are in charge of a truly ingenious and artistic window dresser. The many products of this company seem to be displayed without partiality. A whole window is given to a single line or article, and the goods are surrounded by appropriate accessories and backgrounds. Lay figures, life size, are used, where they can be, to advantage. Tires for automobiles, motorcycles and bicycles have been shown. Belting, life preservers, outing shoes, boots and shoes, and bathroom accessories, are among those recently shown. The Brazilian forest has been represented, also a model of the plantation of the United States Rubber Co. in Sumatra.

A BIG USER OF RUBBER TIRES.

The Fifth Avenue Coach Co., which operates 132 motor-buses in New York City, has just published its annual report for 1915-1916.

A feature brought out in this report is that the 132 buses ran at a cost of only 21 cents per bus mile, each bus using six tires, the rear wheels each having two tires. This cost per mile is based on a mileage of 4,966,690.36 miles. New tires purchased by the company during the fiscal year covered by the report cost \$54,533.63.

A CORRECTION.

In the October number of THE INDIA RUBBER WORLD appeared a statement by its Trenton correspondent regarding the Post Tire & Rubber Co., that on further investigation proves erroneous. THE INDIA RUBBER WORLD is very glad to take this occasion to contradict it.

KELLY SPRINGFIELD COMPANY TO MOVE.

It is practically settled that the Kelly-Springfield Tire Co., now at Akron, Ohio, will occupy a new factory to be built specially for it at Cumberland, Maryland, with the probability that eventually the entire manufacture will be centered there. It is understood that building operations will be begun at once.

NEW INCORPORATIONS.

Alliance Tire & Rubber Co., Inc., September 19 (Delaware), \$2,500,000. William F. O'Keefe, George G. Steigler, E. E. Wright—all of Wilmington, Delaware. Principal office, 901 Market street, Wilmington, Delaware. To manufacture and deal in automobile tires, tubes and accessories.

The Alliance Tire & Rubber Co., Inc., October 9 (Ohio), \$2,500,000. Milton Bejach (president and general manager); John C. Shively (vice-president); Walter H. Christensen (secretary and superintendent); John B. Pow (treasurer), and Frederick W. Throssell. Principal office, Alliance, Ohio. To manufacture automobile tires and rubber goods.

Apex Tire & Rubber Corporation, September 28 (Delaware), \$100,000. Levi Helms, Walter J. Pollock, and Joseph A. McCarthy, 1092 East Third street, Brooklyn, N. Y. Principal office, Corporation Trust Co. of America, 394 duPont Building, Wilmington, Delaware. To manufacture rubber tires and inner tubes for automobiles and other vehicles.

Automobile Salon, Inc., The, September 28 (New York), \$25,000. Hjalmar A. Holm, 672 Park Place; August Engel, 592 Vanderbilt avenue—both in Brooklyn, N. Y., and George Alonzi, 1464 First avenue, New York City. Automobiles and accessories.

Chicle Gum Co., September 6 (Delaware), \$300,000. John H. McBride, 243 W. 76th street, and Hugh Francis Doris, 214 W. 70th street—both in New York City, and John Wynne, 501 Court street, Brooklyn, N. Y. Principal office with M. McLaughlin, 827 Spruce street, Wilmington, Delaware. To manufacture and deal in rubber and vegetable products, chemical compounds, etc.

Colonial Tire & Rubber Co., Inc., September 25 (New York), \$25,000. J. B. Crockett and Amos White, 44 Whitehall street, and Ira W. Henry, 149 Broadway—both in New York City. To manufacture and deal in tires.

Dayton Tire Sales Co., Inc., September 28 (New York), \$10,000. Elbert R. Detamble and John A. Pontolillo, 1764 Broadway, and Bailey C. Elliott, 1400 Broadway—both in New York City. To deal in rubber tires, etc.

Fero's Broadway Store, Inc., September 27 (New York), \$10,000. James J. Fero and William A. Miller, 792 Seventh avenue, and Alfred Hines, 1074 Lexington avenue—both in New York City. To manufacture and deal in automobile tires, accessories, etc.

Goodrich Auto Service Corporation, F. W., September 22 (New York), \$75,000. Frank W. Goodrich, 312 East 58th street; Peter V. Hoyt, 745 St. Nicholas avenue, and Henry W. Showers, 15 Wall street—all in New York City. To deal in tires, auto supplies, etc.

Hygrade Rubber Co., Inc., October 16 (New York), \$10,000. J. F. Kraeutler, Jr., 66 Beaver street, New York City; H. L. Goldbaum, 461 Edgecombe avenue, Bronx, N. Y., and George Kuhlmann, 925 St. Marks avenue, Brooklyn, N. Y. To manufacture rubber goods.

Keystone Rubber & Tire Co., Inc., August 12 (Delaware), \$500,000. M. R. Haymaker, Wilkinsburg; S. W. Crosby, 20th avenue, Homestead, and R. S. Robb, Aspinwall—all in Pennsylvania. Principal office, Keystone Building, Pittsburgh, Pennsylvania. To manufacture tires, etc.

Merit Raincoat Co., Inc., October 20 (New York), \$1,200. Morris Duglin, 828 Longwood avenue; Kassiel Spinner, 700

Cauldwell avenue—both in Bronx, and Louis Kimmel, 499 Riverdale avenue, Brooklyn—both in New York. To manufacture rubber apparel, etc.

National Cover Co., Inc., October 7 (New York), \$1,200. Isaac Raffelson, 1471 Vyse avenue, Bronx, N. Y.; Samuel Greenberg, 400 West 160th street, and Abraham Kruckman, 166 West 141st street—both in New York City. To manufacture slip covers for tires, seats, etc.

National Insulate Co., Inc., October 16 (New York), \$50,000. Peter Meyer, 105 West 120th street, and Simon S. Hamburger, 320 Broadway—both in New York City, and Isaac S. Beck, 767 Tinton avenue, Bronx, N. Y. To manufacture insulating material, etc.

Orville Rubber Co., September 26 (Delaware), \$150,000. Morgan Howells, Bucyrus; E. B. Cornell and E. A. Homeier, Cleveland—both in Ohio. Principal office, Capital Trust Co. of Delaware, Dover, Delaware. To manufacture automobile tires, inner tubes, etc.

Osler Racine Rubber Co., September 22 (California), \$100,000. J. S. Bennett, Hebermain Building, Los Angeles, California. Principal place of business, Los Angeles, California. To manufacture rubber goods, tires, and to do a general rubber business.

Panther Rubber Co., Limited, September 15 (Canada), \$100,000. Charles A. Joslin and others of Sherbrooke, Quebec, Canada. Principal office, Sherbrooke, Quebec, Canada. To manufacture rubber heels, soling, patching and molded goods. It is also the intention of the corporation to purchase the Canadian business of the Panther Rubber Manufacturing Co., Stoughton, Mass.

Perfection Tire & Rubber Co., September 23 (Delaware), \$15,000,000. C. R. Cole, 6029 Indiana avenue; Charles W. Harris, 732 Marquette Building—both in Chicago, and K. S. Wilson, Oak Park—all in Illinois. Principal office with Reynolds Clough, Esq., Dover, Delaware. To manufacture and deal in automobiles, tires, accessories and specialties.

Rubber Tire Sales Co., Inc., September 7 (New York), \$20,000. Walter Ulrich, John F. Forrester, William O'D. Langley—all of 346 Broadway, New York City.

Southwestern Rubber Co., September 15 (Missouri), \$5,000. H. A. Young and G. F. Knight, Kansas City, Missouri; Ransom Stephens, C. D. Darrigrand, and Fred P. Darrigrand, Wichita, Kansas, and D. P. Richardson, Union, Oklahoma. Principal office, Kansas City, Missouri. To do general tire repair business, to operate a tire repair school, to manufacture inner tubes, auto tire sundries, and Ford size tires in wrapped tread type.

Standard Tire Valve Co., September 13 (Massachusetts), \$100,000. Michael F. Clarke and John F. Luther, 40 Central street, and John W. McCormack, Tremont Building—both in Boston, Massachusetts. Principal office, Boston, Massachusetts. To manufacture and deal in tire valves, motor vehicles, and engines and machinery in connection therewith.

Thing & Co., G. E., Inc., October 16 (New York), \$25,000. George H. Mayo, and Henry B. Hubbard, 1790 Broadway, New York City, and J. F. Barnes, 37 Pearl street, Buffalo, N. Y. Principal office, Buffalo, N. Y. To deal in leather and rubber goods.

Tire Co. of Philadelphia, Inc., October 5 (New York), \$6,000. Sydney Bernheim, 35 Nassau street, New York City; Catherine A. Weldon, 591 Seventh street, and Harry H. Jacobson, 555 Grand street—both in Brooklyn, N. Y. To manufacture rubber tires.

Universal Tire & Rubber Co., September 8 (Delaware), \$1,000,000. John Chamberlin, George Davis, 51 Market street, Poughkeepsie, and Egbert B. Cresswell, 119 Eddy street, Ithaca—both in New York. Principal office, Corporation Trust Company of Delaware, Dover, Delaware. To manufacture and deal in rubber goods of every description, automobiles, etc.

TRADE NOTES.

At the annual election of the McGraw Tire & Rubber Co., held at the company's offices, East Palestine, Ohio, the following officers were elected: E. C. McGraw, president; R. W. McGraw, vice-president; John Morgan, secretary, and L. M. Kyes, treasurer. The shares of the common stock were increased from 20,000 to 40,000, changing the par value from \$100 to \$50 per share. The capital stock of the company was increased from \$3,000,000 to \$4,000,000 equally divided between common and preferred. A daily output of 5,000 tires is in early prospect.

The F. E. Partridge Rubber Co. has recently transferred its factories from Montreal, Quebec, to Guelph, Ontario, Canada, enlarged facilities being thus provided for the manufacture of the company's numerous lines of rubber goods, as well as special advantages for handling an increasing trade in druggists' sundries, automobile tubes and tire accessories. To its established range of trade-mark goods, the company has now added the manufacture of automobile tires.

The Firestone Tire & Rubber Co., Akron, Ohio, has purchased a lot at the corner of Broad and Kinney streets, Newark, New Jersey, and will build thereon a three-story structure 50 x 170 feet, to be used as a tire service station.

As soon as a satisfactory site is secured, the Sioux City Tire Manufacturing Co. will commence the erection of its plant, which will probably take the form of a three-story structure, 150 by 50 feet.

The Lapeer Commercial Club, of Lapeer, Michigan, is negotiating for the establishment of a tire manufacturing enterprise in that city, which is prepared to subscribe \$25,000 toward a site and building.

P. H. Boalen, formerly manager of the automobile supply department of the Bailey Co., has recently been appointed head of the sales department of the Mason Tire & Rubber Co., 1806 Euclid avenue, Cleveland, Ohio. The factories of the company are at Kent, Ohio.

The Atlantic Tire & Rubber Co., Wilmington, Delaware, will change its name to Boone Tire & Rubber Co.

The \$250,000 plant of the J. & D. Tire & Rubber Co., at Charlotte, North Carolina, is now nearing completion. The estimated output will be 350 tires a day. H. O. Smith is president of the company.

The Ackerman Wheel Co., founded by A. H. Ackerman, has organized a \$2,500,000 corporation for the manufacture of the Ackerman wheel, a new device for the correction of tire troubles. The new wheel is equipped with spring steel spokes and solid tires. It is stated that negotiations for a \$250,000 plant, at Cleveland, Ohio, have recently been closed.

It is stated that the capacity of the Morgan & Wright factory of the United States Tire Co., at Detroit, Michigan, where the Royal Cord tires are made, will be doubled by or before the incoming of 1917.

The Mutual Tire & Rubber Co., whose incorporation was noted in the October issue of THE INDIA RUBBER WORLD, is a coöperative organization, which offers its stockholders tires, which are the product of the company at a discount from list prices. The officers of the company are William McKay, president; C. E. Barker, vice-president and treasurer, and John Hall Jones, secretary. The executive officers are at 30 East Forty-second street, New York City.

The plant of the Lion Tire & Rubber Co., at LaFayette, Indiana, is approaching completion, and is expected to be in working order and producing tires and tubes before the first of the year. The building is of brick, two stories and basement, 100 by 180 feet. Calenders, washers and machinery have been installed for the production of 200 tires and tubes a day. The

plant is excellently located, is 5 acres in extent, adjoining the Belt railroad, thus furnishing advantageous shipping facilities. The board of directors includes several of the leading business and financial men of LaFayette, Decatur and Peru, Indiana, and Chicago, Illinois.

Plans for the proposed Westgard Tire & Rubber Co., to be erected at Warren, Ohio, are being prepared by a well-known concern of Cleveland, Ohio, architects. The main building will consist of two stories and basement, 100 by 240 feet, of fireproof construction. The power plant will be a separate one-story building, 40 feet square.

PERSONAL MENTION.

The title of Joseph C. Weston, of the United States Tire Co., New York City, has been changed from general sales manager to director of sales, and O. S. Tweedy has been appointed general branch sales manager, instead of assistant general sales manager.

H. H. Grobe, formerly manager of the truck tire department of the Kelly-Springfield Tire Co. in New York City and territory, has been given charge of the Baltimore, Maryland, branch, beginning November 1. Mr. Grobe has been with the company for five years.

F. J. Loewe will be general manager of the new tire plant of the Brunswick-Balke-Collender Co. at Muskegon, Michigan.

John J. Kearns, a vice-president of the Fisk Rubber Co. and head of the research department, and two of his assistants, W. W. Whiting and John C. Cole, have resigned their positions with that company.

Horace W. Hakes, a well-known Michigan tire man, has taken the agency of the Republic Rubber Co., for western Michigan. Mr. Hakes is prominent in masonic and political circles.

Erwin Oberheu has been appointed manager of the Columbus, New Mexico, depot of The B. F. Goodrich Co.

Walter T. Sewell, sales manager of the Sewell Cushion Wheel Co., is making a trip through the East and will meet the branch selling organizations of the company in Pittsburgh, Baltimore, Philadelphia, New York and Boston, to discuss plans for the coming year.

F. W. Sherwood has been made assistant manager of the New York City branch of the Kelly-Springfield Tire Co. Mr. Sherwood is well known in the tire business, having previously been New York manager of the Gibney Tire & Rubber Co. He was also one of the early salesmen of the Diamond Rubber Co. and, later, truck tire manager for the Firestone Tire & Rubber Co.

CHANGES IN UNITED MOTORS CORPORATION.

William M. Sweet, for ten years general manager of the Motor and Accessory Manufacturers, the national organization of the accessory industry, of which tires form an important part, has become assistant to the president of the United Motors Corporation, New York City. This recently incorporated firm is a holding company with Delco, Hyatt, New Departure, Remy, Klaxon and Perlman as its subsidiaries. Mr. Sweet has assumed the management of the new corporation as the representative of the president and board of directors, and will doubtless find his previous experience of great value to him in the present development work along similar lines. While the board of directors felt compelled to accept Mr. Sweet's resignation as president, they elected him a member of the board to succeed Mr. Lovell, and he will serve until 1919. He was also elected chairman of the 1917 banquet committee.

L. M. Bradley, advertising manager of the "American Motorist," official publication of the American Automobile Association, has been elected general manager of The Motor and Accessory Manufacturers' Association, succeeding Mr. Sweet.

TRADE NOTES.

The Lee Tire & Rubber Co., Conshohocken, Pennsylvania, has recently erected a two-story addition, 80 by 120 feet, in which the dipped goods department is to be installed, the removal of this department from the tire building enabling an increase in tire production to about 2,000 tires per day. The new building is of the same construction as the main buildings, steel and concrete, so arranged that additional stories may be built at any time.

The capital stock of the Be Saw Tire & Rubber Co., Hartville, Ohio, has been increased from \$150,000 to \$220,000. The new issue is all preferred stock and the company contemplates using this new capital for additional buildings and equipment which will allow for an increase in the daily output of from 100 to 250 tires.

The Toledo-Findlay Tire & Rubber Co., Findlay, Ohio, has elected new directors for the ensuing year, as follows: C. I. Moffitt, L. W. Eckhardt, F. E. McMannus, H. O. Fellers, Charles Reick, A. O. Hamilton and V. T. Spitler, all local men. The company expects to manufacture automobile casings exclusively in the future.

The Kelly-Springfield Tire Co. of Indiana recently demonstrated the anatomy of its tires from the crude materials to the finished product, in a striking exhibit occupying six windows in the Merchants' Heat & Light Co.'s building in Indianapolis.

The Gillette Safety Tire Co., Eau Claire, Wisconsin, reports that its first factory unit, size 250 by 60 feet, is now completed, and a 50 by 80-foot office and laboratory building is in process of construction. It is expected that the installation of machinery will be completed in time to begin operations in December. Additional buildings will be constructed in the spring of 1917.

The Keystone Tire & Rubber Co., New York City, has increased its capital stock from \$500,000 to \$1,500,000.

The managers of the various tire branches in Cleveland, Ohio, met recently at a "get together" luncheon, inaugurated by C. A. Dunham, manager of the Cleveland branch of The B. F. Goodrich Co., and the affair was such a success that others of the kind will be given. Besides Mr. Dunham, those present were: L. L. MacAnaney, of the Republic Rubber Co.; Charles E. Ball, Portage Rubber Co.; J. H. Bolden, Mason Tire & Rubber Co.; W. H. Barcus, Fisk Rubber Co.; J. D. Hess, Jr., Firestone Tire & Rubber Co.; F. E. Workman, Kelly-Springfield Tire Co.; C. T. Black, Goodyear Tire & Rubber Co.; B. E. Aaronson, Hood Tire Co., and John W. Lawrence, of the Republic Rubber Co. of Cleveland.

Morgan Howells is said to be promoting a rubber company to be known as the Cornell Howells Rubber Co., to be located at Orrville, Ohio.

The American Spring Tire Co., located at 30 West Lake street, Chicago, Illinois, is placing the De Voll spring cushion tire on the market. This tire is a series of Swedish steel springs made to fit inside any outer casing now in use, with the cushioning inside the outer cover, eliminating the disadvantages of the double center. The spring cushions do not come in contact with the casings, but are suspended on four roller bearings, the function of which is to permit the tire to take the side thrust, as allowed by the air tube. It is claimed that in this tire, friction, blow-outs, puncture and other ailments to which tires are subject are eliminated—a delightful if optimistic pretension. The tires are sold under a guarantee and it is estimated that a set of them will last the life of any car.

The stockholders of the Marion Tire & Rubber Co., Marion, Ohio, recently held their first annual meeting at which 125 stockholders were present. The treasurer's report indicated that the company was in good financial condition and prospects

for continued success seemed excellent. The following members were re-elected to the board of directors: W. H. Heverstott, C. W. Fairbanks, J. W. Jacoby, D. H. Lincoln, J. L. Price, C. W. Mapes, A. H. Trout and W. T. Jones. H. L. Gilbert was also elected a director. The factory manager is Grant Lambright.

PERLMAN PATENT CONTISTED.

Details of the important Perlman demountable rim suit were given in THE INDIA RUBBER WORLD of May 1, 1916. That the question of the priority and legality of the Perlman patents may not yet be fully and finally established is indicated by the fact that two suits have been entered against the Perlman Rim Corporation, the later one being that brought by Louis De F. Munger, whose patent is dated December 5, 1899, and, therefore, has but a little over one month longer to run. The other suit is that of Erle K. Baker, of the Universal Rim Co., who is suing for infringement of several patents which involve the mounting of the rim upon a conical seat and the application of lateral pressure.

MID-CONTINENT TIRE COMPANY BUILDS.

The Mid-Continent Tire Manufacturing Co. has begun the erection of a \$160,000 factory at Wichita, Kansas, which will have a capacity of 300 casings and 500 inner tubes a day. The main building will be 300 by 60 feet, two stories high, and there will be two other buildings besides the main one, a power plant and vulcanizing plant, all constructed of reinforced concrete, and fireproof. More than \$50,000 worth of machinery has already been purchased.

At a recent directors' meeting, Henry Lassen, president of the Kansas Milling Co., was elected president of the Mid-Continent company. Ransom Stephens is vice-president and secretary; Charles Darrigrand, treasurer pro tem, and general manager.

RACINE RUBBER CO. ELECTIONS.

Stuart Webster has been elected president of the Racine Rubber Co., Racine, Wisconsin, succeeding H. L. McClaren, resigned. Mr. Webster, who has been with the company since it was organized in 1910, was formerly treasurer and later vice-president, in which office he is succeeded by Louis T. Vance. H. C. Severance remains as secretary and treasurer.

NEW CORPORATION TO TAKE OVER POLACK COMPANY'S BUSINESS.

The Polack Truck Tyre Corporation has been organized under the laws of New York State, with a capitalization of 100,000 shares with no par value, to acquire the assets and business of the Polack Tyre & Rubber Co., Bridgeport, Connecticut. Forty thousand shares will be offered for sale, the proceeds of which will be used for erection and equipment of a new plant to handle steadily increasing business.

The Polack Tyre & Rubber Co. was incorporated in 1912 and acquired the manufacturing rights, formulæ, secret processes, patents, etc., of the European Polack Co., and is now operating 26 active branches in the largest cities of the United States and Canada. Hugo Hoffstaedter, president of this company, will become president of the new corporation, which will also retain the manufacturing and sales organization of the present company.

NEW PENNSYLVANIA TIRE COMPANY.

The Keystone Rubber & Tire Co., Inc., Pittsburgh, Pennsylvania, notice of whose incorporation appears elsewhere in this issue, owns a steel and brick factory, valued at \$125,000, and three acres of ground at Penn, Pennsylvania, on the main line of the Pennsylvania Railroad. An option on 12 adjoining acres allows for future expansion. The plant is being fully equipped and production of the "Keystone" tire will be begun within a short time. The company will employ 600 people, working in three 8-hour shifts.

THE RUBBER TRADE IN AKRON.

By Our Regular Correspondent.

THE annual sales convention of the Firestone Tire & Rubber Co., held during the past month, was the biggest and most successful in the history of the company, about 500 salesmen and agents, from all parts of the United States, and from Canada, England, Australia, Cuba, South America and Europe, gathering at the Akron factory. There were important business sessions, including a close study of Firestone methods and factory work, and addresses were made by H. S. Firestone, president; R. J. Firestone, general sales manager; A. G. Partridge, assistant sales manager, and others. The Firestone clubhouse was lined with exhibitions by the factory departments, and the factory buildings and all rooms in which meetings were held were decorated with the colors of the company, red and black. Banquets, luncheons and sight-seeing trips, including visits to the larger industries of the city, were also enjoyed.

Action on the proposed increase of capital to \$50,000,000, and declaration of a 700 or 800 per cent dividend, of the Firestone company has been delayed until November 2, owing to the fact that stockholders cannot vote legally on an increase in capitalization until after November 1, the last day of the period set for retiring the present preferred stock. It is reported that the proposed new stock issue will be offered to the public through the Cleveland Trust Co., Cleveland, Ohio. The transaction is unique in Akron rubber company financing, as it is the first large issue carrying as low a dividend rate as 6 per cent.

The Firestone company has purchased 150 acres adjacent to the factory for a new power house and additional factory buildings. For every addition wood models are made from blue prints, and exhaustively inspected by officers of the company before actual building commences.

A recently acquired 500-acre tract, to be called "Firestone Park," is laid out with park spaces and reserved tracts for churches and schools, while unusually large home lots are being sold to the employees at 10 per cent down.

At the recent dedication of the Firestone clubhouse, restaurant and gymnasium, H. S. Firestone and Mayor Laub were the chief speakers.

Machinists in the employ of the Firestone company have been granted an eight-hour day and a slight increase in wages over the ten-hour day.

* * *

Actual shipments of products of The B. F. Goodrich Co. for the eight months to September 1 amounted to approximately \$50,000,000, a gain of 40 per cent over the same period of last year, and it is predicted that a total over-turn of \$77,000,000 may be reached this year.

Completion of the fifty-eighth building in the Goodrich factory group will bring the total floor space occupied by this plant up to 4,024,329 square feet, or 92.3 acres. The latest building will have six stories and basement, and will be of brick and concrete construction, almost identical with two other recently completed buildings. It will be 360 feet long, 100 feet deep and 101 feet high above the street level, with 252,000 feet of floor space and a window area of 42,315 square feet. A bridge will connect each floor of this new building with one of the others.

C. R. Serfass, formerly manager of the Columbus, New Mexico, branch of the Goodrich company, has been transferred to Akron.

* * *

The General Tire & Rubber Co. has increased its capital stock from \$200,000 common stock to \$500,000 total capital, divided into preferred stock to the amount of \$200,000 and common stock to the amount of \$300,000. The company now has on order for delivery in the spring, additional equipment which

will double the capacity of the present plant. This equipment will be installed in two additions now being erected, one 60 by 60 feet, three stories in height, and the other a one-story building of saw-tooth construction, 60 by 250 feet in dimensions.

At a special meeting of directors of the General Tire & Rubber Co. held on September 16, the directorate was increased to seven members by the election of G. F. Burkhardt, of Akron, and J. A. Diebolt, of Cleveland. Charles Herberich, vice-president and treasurer of the Depositors Savings & Trust Co. in this city, was elected treasurer. Other officers of the company are: M. O'Neil, president; William O'Neil, vice-president and general manager, and W. E. Fouse, secretary.

* * *

The Star Rubber Co. has been reorganized, with a capital stock of \$400,000, of which \$200,000 is preferred and \$200,000 common. This company has been manufacturing druggists' sundries and automobile tires and tubes in a small way for some years, and with the reorganization, the sundry line will be discontinued, and the output of tires and tubes greatly increased. It is expected that the company's new tire will be on the market about December 1. The new officers are as follows: L. H. Firey, president and treasurer; R. N. Robinson, vice-president; J. B. Huber, secretary, and Fred Gostlin, factory manager.

* * *

Net sales of the Swinehart Tire & Rubber Co. during its last fiscal year, totaled \$1,680,000, according to the annual report presented to the directors on September 28. The company is now making 500 tires a day, and is showing an increase of 20 per cent in business. The following were elected directors: B. A. Polsky, Fred Snyder, W. M. Weldon, Charles Currie, T. E. Barry, Dr. E. L. Mather, T. F. Walsh, F. S. Long and R. E. May. Officers were reelected.

* * *

The Mohawk Rubber Co. is adding a new floor approximately 80 by 150 feet, to an old building, and a three-story annex to one of the recently completed buildings comprising its plant. The total cost of these additions will be about \$60,000, and new machinery, including boilers, calenders, mills, etc., sufficient to increase the present capacity about 50 per cent will bring the expenditure in the neighborhood of \$125,000.

W. J. Smith, of the Mohawk's Akron staff, has been placed in charge of a new Kansas City branch opened by the company last month.

* * *

The capital stock of the Akron Rubber Mold & Machine Co. has been increased from \$60,000 to \$300,000, owing to the rapid growth of its business. Extensions to the company's plant are under consideration.

* * *

V. C. Blandin, Akron representative of Pell & Dumont, crude rubber dealers, 68 Broad street, New York City, will occupy new offices in the Ohio building after November 1.

* * *

An interesting and instructive feature of the annual sales conference of the Goodyear Tire & Rubber Co. held early last month, was an elaborate exhibit tracing the tires and other products of the company from the tropical jungles to the finished product.

In order to secure its own water supply for the power plant and immense battery of vulcanizers, the Goodyear company has purchased a lake, 100 acres of land, and has secured easements of land around another lake.

W. E. Finney, formerly manager of the Goodyear branch at St. Louis, Missouri, has been assigned to the mechanical goods department at the home factory.

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The appointment of Clyde S. Thompson as advertising direc-

tor of the Miller Rubber Co. is the first step in an extensive advertising campaign about to be launched by the company.

* * *

A novel method of advertising mileage records is being carried out by the Amazon Tire & Rubber Co., a Haynes racing car traversing the streets of this city equipped with the company's tires and bearing signs reading "Testing Amazon Anti-blowout Tires. Mileage to date ———." A blank space is left for the figures, and each day the mileage is chalked on the sign.

* * *

The Kelly-Springfield Tire Co. is erecting a 50 by 50-foot, two-story addition to its plant at Wooster.

The Rubber Products Co., of Barberton, has increased its capital stock from \$300,000 to \$500,000, to care for increased business in "Stronghold" tires and in the druggists' sundries line.

* * *

The Marathon Tire & Rubber Co., at Cuyahoga Falls, has increased its capital stock from \$500,000 to \$1,000,000. This company is progressing fast, the business for its fiscal year ending August 31, showing an approximate increase of 70 per cent over the year previous.

THE RUBBER TRADE IN BOSTON.

By Our Regular Correspondent.

BOSTON rubber manufacturers, and by that is meant that large list of manufacturers who market their goods here, or whose factories are situated in eastern Massachusetts, are, without exception, busy. There is no branch of the trade which is languishing because of lack of demand. On the contrary, many manufacturers have all the orders they can fill, and some have more—much more—goods ordered than it will be possible for them to make and ship before the season for their use has passed.

* * *

The present situation in the rubber footwear trade was explained to the members of the New England Shoe Wholesalers' Association at a luncheon given in this city October 11, by George Hutchinson, of the W. H. McElwain Co. He stated that to-day's conditions are not due to any scarcity of crude rubber, nor to any lack of adequate capital or plant facilities on the part of rubber companies. The principal trouble, he attributed to labor scarcity, although this, of course, applies to practically all industries. In Connecticut, for example, rubber factory workmen who formerly received from \$2 to \$2.25 a day, are now getting \$3.50 to \$4, and it is found also that parents whose daughters have been working in rubber factories in order to help out the family income, are not willing, in these prosperous times, that they should work as many hours a week as formerly. As illustrating the inability of some of the rubber companies to meet current demands, Mr. Hutchinson stated that recently one of these concerns had been obliged to refuse an attractive order for rubber tires, amounting to \$300,000, because it could not guarantee deliveries.

"Some of our manufacturers," said Mr. Hutchinson, "are finding it about as bad to have too much business as to have too little."

* * *

According to the balance sheet of the Boston Woven Hose & Rubber Co., dated September 1, the volume of net business for the year was \$6,101,462. The surplus and guarantee is \$1,220,116, as compared with \$1,684,411 on September 1, 1915. During the year under consideration, the capital stock was increased from \$2,000,000 to \$2,750,000 by a stock dividend representing a transfer from surplus earnings of \$750,000.

New buildings and machinery valued at \$322,710 have been added to the plant and charged to earnings for the past year.

The assessed value of the land is \$160,900, while value of buildings is \$1,761,219, a total of \$1,922,119 from which there is deducted the sum of \$533,046 as a reserve for depreciation, leav-

ing \$1,389,072, which is the net figure carried in the balance sheet. The same policy is followed with respect to the item of machinery and tools amounting to \$1,664,282, from which \$879,176 is deducted as a reserve for depreciation.

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In a neat frame in the office of Vice-President Greene, of the American Rubber Co., at the Essex street office in this city, is a motto or sentiment reading: "The man who has the right to



N. L. GREENE.

criticize also has the privilege to commend." This is signed with the initials "N. L. G." Those who attended the banquet given to the salesmen by the United States Rubber Co. last December will remember the slogan of that occasion: "Are We Downhearted?" "No!" "How Is Every Little Thing?" "Fine!"

The author of the slogan, the man who put the questions and received the thunderous answers, was N. Lincoln Greene, whose whole business life, with the exception of a few months, has been spent in the rubber trade. He was born in Boston in 1871 and educated in the public schools of that city. He attended the Boston Latin School preparatory to entering Harvard University, but on account of illness relinquished that plan and in August, 1889, became errand boy for Joseph W. Woods, a cotton broker. This lasted but a short time, when he entered the employ of Houghton, Coolidge & Co., Boston, who were then agents for the Para Rubber Shoe Co. He remained with that firm until the death of A. L. Coolidge, its president, when he resigned his position to go with the Boston Rubber Co., which then manufactured clothing at Chelsea and footwear at Franklin, Massachusetts. When this company was bought out by the United States Rubber Co. in 1892, the latter company continued to manufacture the brands of clothing formerly made by the Boston Rubber Co., having them made at the American Rubber Co.'s factory in Cambridge, Massachusetts. This factory was under the management of S. Lewis Gillette. Mr. Greene became his right-hand man, and in 1911 succeeded him as manager of the clothing department of the American Rubber Co. Under Mr. Gillette's management there were but three clothing salesmen. Since that time the number of salesmen handling that specialty has increased to ten, with a 300 per cent increase in the business.

In January, 1916, the American Rubber Co. and the Stoughton Rubber Co. consolidated. Mr. Greene was made vice-president of both companies and manager of the clothing department. In his present position he not only attends to the manufacturing, buying and selling of the American and Stoughton brands, but also to the clothing manufactured at the Goodyear India Rubber Glove Manufacturing Co., at Naugatuck, Connecticut, the carriage cloth made at the Boston Rubber Shoe Co.'s factory at Malden, Massachusetts, and the topping manufactured at Goodyear's Metallic Rubber Shoe Co., at Naugatuck.

Prior to assuming his present position, Mr. Greene had a wide experience as a salesman, having sold clothing in every State in the Union, in Canada and Mexico, and also traveling in Europe as special representative of the United States Rubber Co. His only business trips now are to the meetings of the clothing salesmen in Chicago, Illinois, and New York City in August and February of each year. He is a member of several clubs, is fond of out-door sports, is an enthusiastic golfer, and has a host of friends and a wide-spread business and social acquaintance.

* * *

The more automobiles, the more tires. Therefore the traffic census of the Massachusetts State Highway Commission is of interest to the tire trade. In the last six years, this report says,

horse-drawn traffic has decreased 5 per cent per year, while motor vehicle traffic has increased 70 per cent per year. This is the result of a systematic count, taken at 238 points, 14 hours per day, for seven days. In 1912 the proportion was 63 per cent motor vehicles and 37 per cent horse-drawn. The 1915 census of traffic showed 82½ per cent motors and 17½ per cent horse vehicles. During the six-year period the total traffic increased 145 per cent, but motor vehicles increased 420 per cent and horse vehicles decreased 30 per cent. There were practically no motor trucks in 1909, but the increase from 1912 to 1915 was 230 per cent.

These are accurate figures. They apply to 1915. Any one at all familiar with the trade knows that 1916 should show an even greater proportionate increase over the previous year. It would not seem far out of the way to estimate an increase of 100 per cent this year over last, and a proportionate augmentation of the tire business. * * *

The Standard Woven Fabric Co., manufacturer of "Multi-bestos" products, and rubber specialties, which recently acquired the plant of the Walpole Rubber Co., at Walpole, has sold its plant at Framingham to the Bela Body Co., manufacturer of automobile bodies, which will remove there from Amesbury, Massachusetts. * * *

The Latons Manufacturing Co., of Worcester, manufacturer of suspenders and other elastic webbed goods, has moved to larger quarters, having leased some 6,100 square feet of floor space in the new addition of the New England Corset Co.'s building, on Green street, in that city. This change will more than double the capacity of the first-mentioned company. * * *

The plant formerly occupied by the Bemis Rubber Co., near Bemis station, in Watertown, has been sold to the Sawyer Products Co. of East Cambridge. The premises consist of 2½ acres of land, and factory buildings with an aggregate floor space of about 17,000 square feet. There is also a railroad siding connecting with the Boston and Maine railroad. The new owners will make extensive improvements and will operate the factory in the manufacture of an entirely new product. * * *

Merton A. Turner, sales manager of the Monatiquot Rubber Works Co., South Braintree, Massachusetts, and Miss Olive H. Grant were married at the residence of the bride, in Braintree, on October 11. The marriage was a quiet one, only immediate relatives of the bride and groom being present. The honeymoon was spent on an automobile trip. Mr. Turner has a host of friends in the trade who are sending congratulations. * * *

Charles W. Barnes, of the New York City office of the United States Rubber Co., was in Boston a week ago on a sad errand. He was a resident here previous to his transfer to the head office, and his aged mother made her home in Cambridge. Last month the old lady, ninety years of age, visited friends in New Glasgow, Nova Scotia, and on the 19th, died in a house but a short distance from the one in which she was born. Mr. Barnes brought the body to this city for burial. * * *

Frederick C. Hood, of the Hood Rubber Co., opened the attractive grounds of his estate, in Brookline, the 7th of last month, for the exhibition of puppies by the Airedale Terrier Club of New England. Mr. Hood's estate was an ideal place for the show, the residence situated at the top of a hill, and the judging ring was one of the terraces leading to the garden. Mr. Hood was awarded a prize for his "Boxwood Bingley Bountiful." * * *

Ira A. Burnham, vice-president of the American Rubber Co., is nursing a broken collar bone, the result of an automobile accident. Mrs. Burnham had three ribs fractured at the same time.

THE RUBBER TRADE IN TRENTON.

By Our Regular Correspondent.

TIRE manufacturers here are much interested in the Egan good roads bill, which is to be voted upon by the people of New Jersey at the November election. The bill provides for the appropriation of several millions of dollars to be expended in building good roads from one end of the State to the other. One of the results of the law's enactment, it is believed, would be a big boost to the auto and, consequently, to the tire business. * * *

An electrical show will be held in Masonic Temple, December 6, at which time there will be a display of insulated wire and hard rubber goods used in connection with electrical devices. * * *

William R. Thropp & Sons, Co., the well-known rubber machinery house, has found it necessary, owing to the increase of its business, to purchase additional real estate, adjoining its plant, on East State street. * * *

John M. Miller, for 17 years with the Empire Rubber Tire Co., of this city, has been appointed manager of the Cleveland, Ohio, plant of the Polson Rubber Co. He will enter upon his new duties the first part of November. * * *

Dale O. Pohlman, sales manager of the Thermoid Rubber Co., returned about the middle of last month from a trip during which he visited the St. Louis, Indianapolis, Chicago and Detroit branches of the company. * * *

J. M. Dawson has been placed under arrest here on the charge of passing bogus checks, some of which he is said to have used to defraud people in the rubber trade. According to the police, Dawson obtained a facsimile of the checks used by the Crescent Insulated Wire & Cable Co. Several checks, alleged to have been passed by Dawson, were received, in due course by the First National Bank of Trenton and were declared to be forgeries. * * *

The John A. Roebling Sons Co., of this city, has leased a five-story and basement warehouse at 223-227 Arch street, Philadelphia, Pennsylvania. The building, it is said, will be used for making wire goods and for storage purposes.

THE RUBBER TRADE IN RHODE ISLAND.

By Our Regular Correspondent.

WHILE the several rubber factories throughout the State continue to report an unprecedented business activity, the increasing scarcity of desirable help is causing considerable worry. Goods of every description are being shipped in large quantities daily, and to all parts of the world. Rubber shoes of all kinds are being distributed to every section of this country and to many foreign ports. Tennis shoe orders are large. * * *

Some time ago the employes of the Revere Rubber Co., Olneyville, with the assistance of the officials, formed a "safety first" committee, and great strides are being made in the company's plant in the work of protecting the employes. In a large rubber manufacturing establishment such the Revere company's, accidents are more or less numerous, because of the number of grinding and other large machines. The "safety first" body has been going through the plant in a systematic manner, covering up the dangerous parts of the machinery, and educating the employes to be more careful at their daily toil and to take better care of themselves. As a result of this work, the number of accidents has been reduced, until the hospital of the plant, a modern improvement recently established, is amply able to attend to all the cases.

The committee, having in mind the health and physical well-being of the employees, has organized a "keep clean" sub-committee whose duty it will be to see that all of the working, wash and toilet rooms are kept as clean as possible. This committee is already doing much good among the employees, and it is predicted that this will be one of the model plants of the entire United States Rubber Co.'s system of factories within the coming year.

* * *

The new brick addition to the vulcanizing department of the National India Rubber Co.'s plant at Bristol, is very nearly completed and will be ready for use before the end of the year. The new vulcanizers are now being placed in position in the addition.

John W. Church, for many years connected with the business affairs of the National India Rubber Co., and more recently head of the traffic department, has accepted a position with Peckham Bros., automobile and supplies dealers, Providence. He is succeeded by W. L. Dudley, of Woonsocket, who has had several years' experience in the business.

Chester R. Colwell, who for several years has been in charge of the carpentering department at the National factory, has resigned to accept a position in Providence. William C. McLaughlin, for several years draughtsman and pattern maker in the department, has been appointed to fill the vacancy.

* * *

The filing of a corporation return at the office of the city clerk of Pawtucket shows that the paid-in capital of the Phillips Insulated Wire Co. has been increased to \$2,500,000, the full amount allowed by the charter amended at the January session of the General Assembly of the present year. The return is signed by the following: Henry F. Bassett, president; Herbert O. Phillips, treasurer; Edgar B. Phillips, secretary; Henry F. Bassett, Herbert O. Phillips and Charles F. Price, directors.

* * *

A third dividend of 16 $\frac{2}{3}$ per cent has been ordered paid to the creditors of the Consumers' Rubber Co., of Bristol, by the referee in bankruptcy, Nathan W. Littlefield. This makes a total of 56 $\frac{2}{3}$ per cent that has been allowed so far, the last dividend now being payable by the trustee, Robert S. Emerson, of this city.

* * *

The Bourn Rubber Co., Westfield street, Providence, reports an especially busy year so far, and at present is being driven to capacity in nearly all departments. This is particularly true of the insulated wire department, and during the past month several additions have been made to the working force of that section.

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The Narragansett Rubber Co., of Bristol, is adding to its plant. A new two-story wooden building, 88 feet in length and 50 feet in width, is practically completed, the lower floor of which is to be used as a calendering room.

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Albert Lodlum, who has held a prominent position with the Revere Rubber Co. for several years, has resigned. Before leaving, his associates presented to him a gold watch chain and fountain pen.

* * *

During the past month the assessors of taxes in the various towns and cities throughout the State have been filing their annual assessment lists. Among the larger taxpayers are the following who are identified with the rubber industry, in addition to those previously reported: At Cranston—Atlantic Tubing Co., \$22,415; William B. Banigan Estate, \$34,160; Emma T. O'Connor, executor of William B. Banigan's will, \$97,600.

At Pawtucket—Collyer Insulated Wire Co., \$67,420; Everlastik, Inc., \$187,020; Hope Webbing Co., \$828,860; Phillips Insulated Wire Co., \$664,980; Tubular Woven Fabric Co., \$34,180.

* * *

The International Rubber Co., which is being operated several hours each evening, in addition to a full-time day schedule, turning out carriage cloth at West Barrington, experienced a shortage of white cloth which necessitated a shutdown for a couple of days.

* * *

Henry L. Scott & Co., formerly of 223 Eddy street, Providence, have removed their offices and factory to their new building, Blackstone and Culver streets. The new factory has been equipped with the latest machinery and appliances and a cordial invitation is extended to the trade to visit the plant and inspect late models. This company specializes in the manufacture of machines for the testing of rubber and fabrics used in the production of rubber merchandise.

* * *

While overhauling the Millville plant of the Woonsocket Rubber Co. recently, the workmen found the cylinder head on the engine so badly cracked as to preclude any possibility of using without repairs. It was necessary to shut down the plant for several days while the work was being done.

* * *

James Leach, for over 21 years employed by the Mechanical Multiple Fabric Co., the last 19 years as foreman of the spreading department, has resigned to accept a similar position with the Firestone Tire & Rubber Co., of Akron, Ohio. His local associates presented to him a gold watch chain and charm and a substantial leather suitcase, Superintendent Lloyd, of the Fabric company making the presentation speech.

RUBBER CLUB BANQUET ANNOUNCEMENTS.

INTEREST in the coming banquet of The Rubber Club of America, Inc., to be held in New York City January 8, will be heightened by the announcement that two of the speakers on that occasion will be Hon. William H. Taft, Ex-President of the United States, and F. A. Vanderlip, president of the National City Bank of New York, both of whom will speak on important national matters of direct interest to the rubber trade. Committees are being appointed to promote interest in this meeting. The following have already been chosen, and are at work in their various sections:

CANADIAN COMMITTEE. Charles N. Candee (chairman), Gutta Percha & Rubber, Limited, Toronto; T. H. Rieder, Canadian Consolidated Rubber Co., Limited, Montreal; J. Westren, Dunlop Tire & Rubber Co., Toronto.

BOSTON COMMITTEE. Hon. L. D. Apsley, Apsley Rubber Co., Hudson; Frederick H. Jones, Tyer Rubber Co., Andover; Harold P. Fuller, E. H. Clapp Rubber Co.

AKRON COMMITTEE. H. S. Firestone, Firestone Tire & Rubber Co., chairman.

TRENTON COMMITTEE. J. A. Lambert, Acme Rubber Manufacturing Co., chairman.

A NEW RUBBER ASSOCIATION.

Efforts are being made in London to form a new rubber association which would devote special attention to British interests in the rubber industry in Java and Sumatra, which are very extensive.

It is said that the Rubber Growers' Association was approached with a view to the formation of a separate branch under its auspices, but as such arrangement could not be made, it is proposed to proceed independently. In fact, in certain respects the problems plantation companies have to deal with in the Dutch East Indies are quite different from those of the Malay and Indian companies.

The India Rubber Trade in Great Britain.

By a Special Correspondent.

FROM information received from different sections of the country it appears that the volume of general trade continues to be good, but pneumatic tire manufacturers report a slack business. There is a constant turnover, but it is stated that the restrictions on the use of petrol, or gasoline, as you call it, have, in fact, seriously affected the tire trade. A great number of automobiles are laid up in garages; even commercial cars in some cases have been idle for months, largely owing to the prohibitive price of gasoline.

RUBBER HELPS SOLVE GASOLINE SHORTAGE.

Many owners of commercial automobiles are now using city gas instead of gasoline as a fuel for their motors.

The use of gas as a fuel for automobile gasoline engines is not new, for town gas has long been used by manufacturers for the preliminary testing of their engines, though it will not give the power of gasoline.

The problem was to conveniently carry this city gas on vehicles. At first it was attempted to store it in metal tanks, under



MOTOR BUS WITH RUBBER-LINED GAS CONTAINER

pressure, but these were found far too heavy for practical use on motor trucks and, after many tests and experiments, the accepted container now is a double texture canvas bag with rubber insertion, rendering it water and gas tight. This is roped or strapped to the roof of the vehicle and is filled from the gas supply mains. Far from increasing the weight of the vehicle, this rubber-lined gas-bag rather has a tendency to lighten the load on the springs.

SOLID TIRE BUSINESS GOOD.

While business is slack and competition very keen in the pneumatic tire trade, the solid tire industry is working night and day and there is unlimited faith here in this branch of the rubber industry.

MECHANICAL RUBBER GOODS.

Manufacturers of mechanical rubber goods are doing very brisk business and there is no sign of slackness in this line in the near future.

Rubber toy and novelty manufacturers also report excellent orders.

The demand for rubber soles and heels is increasing every day and large manufacturers in this line are well employed. Some small ones, however, are said to be experiencing a trying time, due to the fact that the withdrawal of labor from small works is usually more seriously felt than similar withdrawal from large factories.

RECLAIMING INDUSTRY.

Rubber reclaimers continue to suffer from the labor difficulties mentioned in a former communication, but they are nevertheless doing a roaring business and have trouble in promptly meeting orders.

WATERPROOF GARMENTS, ETC.

The waterproof garment people are working full time and overtime. They have received large government orders for garments for the soldiers, who are sure to pass another winter in the trenches, and the wet weather we have been experiencing has made a great demand for waterproof garments, both rubberized and chemically treated.

Cable and insulated wire manufacturers have all the work they can handle.

Demands for all kinds of surgical rubber and other hospital appliances are increasing daily.

TIRE MANUFACTURERS' ASSOCIATION.

The British Rubber Tyre Manufacturers' Association, Limited, is the name of an organization recently formed "to watch over, protect and advance" the interests of British tire manufacturers.

To qualify for membership, a tire manufacturer must have his principal works in the United Kingdom and his tire sales must be to the extent of at least 90 per cent manufactured in Great Britain. Companies whose capital is to the extent of 25 per cent or more held, directly or indirectly, by individuals resident outside the limits of the British Empire, will be barred from membership.

Dealers in rubber tires may become members of this association provided the sale of tires is their principal business though, even then, their admission to membership is discretionary with the general committee of the association. Rubber manufacturers whose works are situated in any British colony, dependency, or self-governed dominion are also eligible for membership at the discretion of the general committee.

RUBBER MACHINERY NEEDED IN CHINA.

From a recent report of our Board of Trade, it appears that machinery will be required in the near future for the rubber plantations in the island of Hainan, China.

The Board of Trade tells us that there is an American merchant at Kiung-chau, Hainan, China, and under existing conditions it is probable that an American manufacturer will get the business.

RUBBER EXPORTS TO HOLLAND.

The Foreign Office has issued notification that no additional export licenses or other facilities will be given for the export from England of rubber and balata to Holland or Sweden until further notice.

CHANGES IN EMBARGO LIST.

The Royal Proclamation of May 10, giving a list of prohibited exports, has been amended. The heading, "Goods wholly or partly of rubber, gutta percha or balata," has been deleted from the list of prohibition to all destinations, but has been added to the list of prohibition of exportation to all non-British destinations.

NEW RUBBER IMPORTING COMPANY.

Ernest Gray & Co., Limited, was registered recently with a capital of £1,000, in £1 shares, to carry on a general import business in dentists' supplies, including dental rubbers and other articles composed of rubber, porcelain or similar substances. This new company's address is Cul-de-Sac Road, East Molesey, England.

THE SITUATION IN FRANCE.

By our Regular Correspondent.

SINCE my last communication I have had the opportunity of visiting Clermont-Ferrand, the center of our rubber industry, the Akron of France. I had not been there since the outbreak of the war and I assure you that the changes brought about by the present conditions are much more visible there than here in Paris.

Your readers are familiar with the important role rubber tires are playing in this war; they also know that the tire industry has always been the chief rubber industry in France, and that—since we settled down and organized for war conditions—our tire manufacturers have been able to supply practically all the needs of our armies and to do much for our Allies. But what your readers probably do not know is that our rubber manufacturers have adapted their manufacturing facilities to the production of many articles that are only remotely or not at all related to rubber.

All the factories in Clermont-Ferrand are under military control; army officers, army engineers, and men in uniform have charge of everything and are doing all the work that cannot be



ARMY TRUCKS AT MILITARY REPAIR STATION.

trusted to women. I found Michelin and Bergougnan making aeroplanes; not only the rubberized fabrics for covering the wings of flying machines, but whole machines, even motors. They are doing this besides producing more tires than they ever did in peace times, and they are also turning out shells, cannon parts, artillery wheels, fuses, cartridges, and all sorts of metal and rubber sundries. Their valve departments, rim and wheel shops were found to be well suited, both as regards workmen and machinery, for producing a score of articles they never before dreamed of turning out. In one plant I saw 50 huge aeroplanes in course of completion, and practically all the men working on them had been rubber workers, mechanics, carpenters and die-makers in rubber factories prior to the war. This was a revelation to me. I had no idea of such developments in our rubber industry. I had read in *THE INDIA RUBBER WORLD* about the adaptability shown by the German rubber industry, but did not suspect that ours had equaled it in this direction. But they have perhaps gone still further. Clermont-Ferrand rubber workers are making all sorts of things that were unknown to them a year ago and they are doing it as though they had never done anything else. The organization is perfect.

ORGANIZATION.

Speaking of organization, never, in any circumstances, have French manufacturers shown greater activity, more ardent desire to complete and improve, in the economic battle-field, the victory France will owe to her incomparable soldiers.

Old organizations are rivaling in zeal and effort in the work of necessary preparation for securing new outlets for the prod-

ucts of the national industries, including the manufacture of rubber. New organizations are being constituted. Special publications are coming into being. All are working for the commercial and industrial future of our country.

Writers, who formerly devoted their time and talents exclusively to literature, are now placing their pens in the service of the work that is necessary to the France of tomorrow. All consider it a duty to complete the work of our brilliant armies. France is organizing for future economic battles, and the ardor and the excellent intentions of our people will result in positive achievements. We recognize that one of our greatest faults was lack of organization, and we have been working to correct it. Our army officers have taught much to our business men. They have shown what great things can be accomplished smoothly, with proper organization. Our army motor transport service is a model of organization. Take the rubber tire departments, for instance:

TIRE DEPOTS.

The quantities of tires consumed by thousands of vehicles under war conditions is difficult to imagine; it cannot be mentally grasped by mere multiplication of numbers. I recently visited a tire depot. I saw thousands and thousands of permanent-band solid rubber tires. Tier upon tier, pile upon pile, huge ribbed pillars; a veritable forest of them. In and out they were being rolled like huge hoops. As fast as they go out, they are replaced by new arrivals.

The pneumatic tire storage warehouses have racks built from end to end, and these racks, of great height, are filled with tires that stand upright, side by side, making walls of rubber. The multiplication of all makes and sizes is handled with system and precision.

The system is wonderful. In tire casualties, which, naturally, are very numerous, the tire and tube is quickly inspected by a staff of experts and a report sent back to the unit from which it came. When the tires are repairable, they are sorted out into two lots—one lot repairable at the depot is at once sent to the local tire repair shops, and the other lot, representing the almost unrepairable, is sent to the factory.

Useless tires are sent to a special department which attends to their disposal as rubber waste. Nothing is too small to be conserved, and waste is reduced to a minimum.

PLANTATION RUBBER IN COCHIN CHINA.

The series of articles being published in *THE INDIA RUBBER WORLD* on "Plantation Rubber in Cochin China," is the subject of great satisfaction in our rubber circles.

Most of our rubber manufacturers have large investments in these plantations, many of which are already paying propositions.

FRENCH IMPORT OFFICE IN LONDON.

Our government has opened a special office in London for the granting of licenses for the importation into France and Algeria of goods coming through London and under import prohibition in those territories.

PERSONALS.

Emil Desmidt and Eugene Roux, rubber planters in Cochin China, lost their lives during the recent fighting in the Argonne section of the Western battle front.

IMPORTANT HYDRO-ELECTRIC PROJECTS IN FRANCE.

The American Consul at Grenoble, France, reports that interest in hydro-electric development has been recently revived by the Chamber of Commerce of Grenoble to attract new industries to that part of France. Contemplated installations will use the energy furnished by the water courses of the Alps to reach an aggregate mean production of about 265,000 horse-power, and will require large quantities of insulated wire and cables, as well as other electrical apparatus.

RUBBER TIRES IN NORWAY.*By Our Regular Correspondent.*

THE prosperity now prevailing in Norway is reflected in the increased use of motor vehicles, both pleasure and business. By far the larger number of automobiles imported come from the United States, but large consignments are also received from Italy. All these are imported without tires.

Under an arrangement with the British authorities, all rubber tires are imported into Norway through London and consigned only to the Royal Automobile Club, Christiania. The club distributes the tires to the dealers, who are obliged to give guaranties that they are to be used only in Norway. The greatly increased demand for automobiles has made it difficult to obtain rubber tires sufficient to supply the requirements of the trade.

Last October, as was reported in *THE INDIA RUBBER WORLD*, the automobile club succeeded in obtaining permission to import 9,000 automobile tires, 4,800 motor tubes and 800 motorcycle tires during the current year. At that time the quantity was deemed sufficient for the needs of the country. The prosperous times, however, have upset all calculations. While on January 1, 1916, there were registered in Norway only 1,520 automobiles, the number has now increased to 2,084, and it has become apparent that the automobile supplies for which licenses had been obtained will not last through the year. The secretary of the automobile club recently went to London to confer with the authorities there on the subject, and has succeeded now in securing an extension of the limit on tires and tubes for automobiles and motorcycles.

The distribution of the tires will be handled jointly by the Royal Automobile Club of Norway and the Rubber Importers Association, organized under the auspices of the club. For every new tire delivered a worn-out one must be turned in to the club.

SOME FOREIGN RUBBER NOTES.**TIRES IN SCANDINAVIAN COUNTRIES.**

THE tire famine in Scandinavian countries continues acute, especially in Norway and Sweden.

In the early months of the war and during the year 1915 many tires were smuggled from Scandinavia into Germany, and now Great Britain, which holds the key to the tire situation in Europe, is applying most stringent measures in controlling the supply to European neutrals, allowing but small consignments, and these at infrequent times.

The result of this is that a set of average-sized tires to-day in Sweden costs the price of a Ford car in the United States. In Stockholm 34x4 tire casings sell for the equivalent of \$150 in United States gold, and \$25 is a current price for inner tubes of the same size.

SWISS TRADE IN RUBBER GOODS.

Imports of rubber and rubber goods into Switzerland during the year 1915 amounted to \$1,624,026, against \$1,562,425 during 1914. Export of similar articles amounted to \$512,428 and \$335,266 during the years 1915 and 1914, respectively.

Reexportation of raw and manufactured rubber is only allowed to those countries from which or through which the articles or raw materials have been imported and into countries that are allies of these.

The Contraband Department of the British Foreign Office has caused publication of a list of articles in respect of which licenses for export to Switzerland are only granted if the goods are consigned to the S. S. S. (*Société Suisse de Surveillance Economique*). Among the articles listed are: All forms of rubber, balata, gutta percha, raw or *re-melted* (*sic*), including waste and ebonite; rubber wares; rubber-proofed and rubber-mixed goods.

Erasers, toys, drains, gloves, injectors, dental rubber and mixed rubber wares, partly rubber, can be sent under what is known as

the small parcel scheme; that is to say, they may be exported from Great Britain to Switzerland without an acceptance certificate from the S. S. S. But this does not prejudice the right of the War Trade Department to insist on the production of a certificate from the S. S. S., where this is considered desirable. All parcels must be consigned to the S. S. S. for account of the ultimate consignee, via the International Postal Parcels Bureau, Pontarlier, France.

PORTUGUESE EMBARGO ON RUBBER.

On August 14 the Portuguese Government issued a decree declaring certain merchandise contraband of war. On a schedule of these contraband goods appear rubber, gutta percha, and similar substances, including these commodities in the crude state, reclaimed, or as waste, solutions, cements, and goods made partly or wholly thereof.

RUBBER IN HERRING BARRELS.

An English contemporary states that a German merchant, representing a German rubber factory, and three other persons, were sentenced at Copenhagen, Denmark, recently, to 120 days' imprisonment, each, and, in addition, fines, amounting to 350,000 kronen [\$91,000], were imposed for smuggling raw rubber from Denmark into Germany concealed in salt herring barrels.

JAPAN'S IMPORTS OF CRUDE RUBBER.

According to the official trade returns of Japan, the total value of crude rubber and gutta percha imported during the first six months of 1916 amounted to 3,626,000 yen [average value of yen for this period, .5075 cents] against 1,560,000 yen during the corresponding period of 1915, more than 220 per cent.

RUBBER BRINGS PROSPERITY TO SHANGHAI.

The American Consul General at Shanghai, China, reports that local investments in rubber plantations in Malaya appreciated largely in value during the year 1915 and brought much ready money into the hands of investors; the large sums invested in 1910, the year of the rubber boom, were to a certain extent recovered. The appreciation of rubber investments had a beneficial influence on retail trade, as investors who made large profits were more inclined to buy luxuries.

MULTIPLE FACTORY SYSTEM ON RUBBER PLANTATIONS.

It has for some time been the tendency on Far Eastern rubber plantations to build one or two very large buildings and there centralize the work of curing the output of the estate.

The Mooply Valley Rubber Co., Limited (Ceylon), has departed from this practice and is completing six factories—one on each division of its estates. Five of these factories will turn out high-grade crude rubber, each serving 800 to 1,000 acres, and one factory will deal entirely with scrap. Because the transport of latex will be materially less, it is considered that this multiple factory system will give as good results from an economical point of view as where one large factory is used. Other advantages will be five managers competing with each other in trying to turn out the best rubber possible, each man having the responsibility of growing, cultivating and turning out the finished crude rubber. Thus there will be interest and emulation that can hardly be expected under present conditions. Smaller individual plants will make for closer supervision and thus facilitate the production of quality as well as quantity. Another definite advantage of this system of one factory for each division is that if a breakdown or a fire occurs in any factory, there will be no great trouble in handling the latex in the other plants of the same estate.

Rubber Planting Notes.

MALAYAN PLANTERS FEAR AMERICAN INVASION.

SOME anxiety appears to exist in Malaya concerning what is termed the "American Invasion."

It is asserted that representatives of American rubber interests are seeking land grants in the Federated Malay States and the planters fear that, should the local government grant any large area to these interests, such action might add to the present difficulties of the labor question in Malaya.

Rubber estates import most of their coolies under contract and have difficulty in preventing them from breaking their agreements and going to work for native land owners. The fear is that there would be created a fresh demand for labor if large areas were to be opened up at one time.

Besides this question of shortage of labor, there is, of course, the question of wages, which the planters do not wish to see higher than the present level.

Our Malayan contemporary, "Grenier's Rubber News," suggests that a good way to obviate the danger would be to make all grants of land conditional on the Americans importing all the labor necessary, and perhaps more, for the new plantations. In other words, guarantees should be secured from American interests to safeguard the labor in the Federated Malay States from a partial or wholesale absorption by the "invaders," whose motive spirit does not appear to be questioned, our contemporary explaining: "An area of 100,000 acres opened up next year will yield probably in 1921 only about 13,000 tons of rubber, and in that year of grace the American requirements of the commodity will be more than 15 times that quantity, and Britain will still hold a great preponderance of power."

DISEASES OF PLANTATION HEVEA IN CEYLON.

From the annual report of the botanist and mycologist of the Ceylon Agricultural Society, it appears that during the year 1915 this society received 44 consignments of *Hevea Brasiliensis* disease specimens for examination.

The specimens of *Hevea* sent in for report showed that in prevalence the diseases occupy the same relative position as in former years, and, taken altogether, there appeared to be a general diminution of disease.

The "canker" fungus, *Phytophthora Faberi*, again heads the list. Pod disease caused by this fungus was severe in some districts in July; this was accompanied by heavy leaf-fall, owing to the spread of the fungus to the leaf stalks. This condition has recently been reported from South India.

Canker of the leaf stem in its early stages has been effectively treated by light scraping and treatment with 20 per cent solution of carbolineum in water.

Canker at the collar of trees was found in the Matara district, where it had nearly ringed several trees. By early and vigorous treatment it is deemed possible to lessen, to a considerable extent, the ravages of this fungus.

Towards the end of the year *Fomes lignosus* (same as *Fomes semitostus*) was reported on several occasions from the Kelani Valley. Drastic removal and burning of diseased roots and jungle stumps where these still occur in rubber clearings is recommended to reduce the losses from this cause.

Decay of the renewing cortex or "bark rot," as it is more generally termed, was somewhat prevalent about July and November, during wet weather experienced in those months. In December experimental work was initiated in connection with this disease. Inoculations of the freshly tapped surface of healthy trees with diseased bark yielded no cases of infection. Treatment with 20 per cent water solution of carbolineum appeared to mitigate the

severity of fresh attacks, but had no immediately apparent effect in arresting the rot of bark already affected.

This disease would appear to be capable of explanation on purely physiological grounds.

Treatment of diseased areas with clay and cowdung mixtures is being tried as a means of accelerating the process of occlusion of exposed wood surfaces.

One case of *Poria hypolateritia* killing young *Hevea* was observed on the Experiment Station at Ganoruwa.

A case of *Colletotrichum ficus* was recorded on *Hevea* leaves.

The rubber research chemist of the Ceylon Agricultural Society started an investigation into the formation of latex cells in conjunction with the botanist and mycologist in August, 1915. This research will cover a period of at least one year in order to allow of observations being made in various seasons of the year.

Observations made on samples of bark from numerous trees indicate that the number of rows of latex cells varies to a considerable extent, according to the height from the ground.

INSECT PESTS OF HEVEA IN CEYLON.

In a recent number of "The Tropical Agriculturist," the Assistant Entomologist of the Department of Agriculture of Ceylon states that *Hevea* rubber on Ceylon plantations appears to maintain almost complete immunity from insect ravages. Such pests as have been reported during the past year were either scarcely pests at all or confined their attacks to sickly or diseased trees. No reason can be assigned for this, other than the one put forward by Mr. Green some years ago,—that the latex acts as a strong deterrent against any attempt to penetrate the bark. The following pests were reported during the fiscal year 1915-1916:

Mariella dussumieri, the rubber slug, was reported as drinking latex, in Udugama in March.

Scolytidae, boring beetles, were reported several times but, on investigation, it appeared that the borers attack only unsound bark, and are probably attracted by the fungi which grow in it and not by the bark or the wood.

Lecanium nigrum, the black scale insect, was reported from various districts in August and October, but in each case it appeared to do little harm.

Batocera rubus, root and stem borer, was reported from Pelmadulla in November, when it was taken from the stem of a rubber tree which had fallen down through the damage done by the grub.

THINNING OUT RUBBER.

Our Ceylon contemporary, the "Tropical Agriculturist," publishes the following table, showing the result of thinning out rubber on a plantation 20 years old:

FIFTEEN ACRES OLD RUBBER.

Season.	Crop.	Yield Per Acre.	Trees.	Trees Per Acre.	Rain-fall.
1907-08	4,003	267	2,419	161	145.41
1908-09	4,020	288	2,419	161	168.49
1909-10	5,146	343	2,419	161	137.65
1910-11	6,594	439	2,419	161	142.64
1911-12	6,425	428	2,419	161	167.02
1912-13	6,532	435	2,419	161	161.41
1913-14	6,001	400	2,180	145	196.84
1914-15	6,596	439	1,604	106	134.97

These figures show that profitable results follow the thinning out of a plantation, even of this age; at least, under certain conditions. There are no data for laying down definite conclusions on this subject. It depends upon so many factors: the original spacing, climate and price of rubber.

The Committee of Agricultural Experiments of the Ceylon

Agricultural Society holds that thinning out should not be delayed too long, but should be done early enough to allow the trees ample opportunity to branch.

The Experiment Station of the Ceylon Agricultural Society is cutting out two small plots of *Castilloa* rubber, having decided that the space could be more usefully planted with other products. A few specimen trees will, however, be retained.

PLANTERS IN ARMY SERVICE.

The "Malay Mail" of Kuala Lumpur, Federated Malay States, as a supplement to its August 4 issue, publishes a "Roll of Honor" containing a list of names of present or past residents of the Malay States under British protection, who have lost their lives in the present war. This is followed by a list of such residents who have been, or shortly will be serving in the British army. It will be noted that by far the majority of the names on both lists are those of planters, or men in some way connected with the planting industry.

PROHIBITED EXPORTS FROM INDIA.

A notification issued by the Department of Commerce and Industry of India contains a revised list of articles, the exportation of which is at present prohibited from British India. Among these articles appears rubber, raw and manufactured, which cannot be exported to any destination except the United Kingdom, France, Russia (except the Baltic ports), and British possessions or protectorates.

BARK ROT OF *HEVEA* IN BURMA.

THE Department of Agriculture of British Burma has published a most interesting bulletin on "Black Thread Disease of *Hevea* in Burma," by I. F. Dastur, First Assistant Imperial Mycologist at Pusa, Burma.

The "black thread disease" is what is commonly known in Ceylon as "bark rot," and has received repeated mention in THE INDIA RUBBER WORLD.

The naked tissues laid bare by tapping become disfigured and damaged by the appearance of vertical, slightly depressed black lines. These follow the tapping cut as it is continued down the trunk of the tree and extend through the cambium into the wood. The blackening of the tissues runs along the tapped area and eventually covers the whole cut. Diseased areas soon become vertically cracked, especially in wet weather. From the vertical cracks latex occasionally exudes. In some cases there is a thick wad of coagulated latex between the diseased renewing bark and the wood; in these cases the cambium is completely destroyed and there is always a bulging out of the diseased renewing bark. This soon decays, leaving behind a gaping wound, exposing the wood. A true "canker" is thus formed. It is the damage to the cambium which constitutes the most serious feature of the disease, for it is upon the activity of this tissue that the tree depends for the smooth and even regeneration of the bark cut away during tapping.

Careful inoculation experiments conducted by Mr. Dastur, with pure cultures, have proved that this disease is caused by the same fungus, a species of *Phytophthora*, which attacks fruits and causes them to rot, and to which certain experts have attributed the cause of abnormal leaf-fall. Inoculation experiments on tapping cuts, renewing bark and old bark showed that the fungus was capable of attacking the tree only through wounds. Inoculations made on uninjured parts of the stem and branches invariably failed, while those on the wounded surface were successful.

The disease first makes its appearance soon after the rains set in, and completely disappears after the close of the wet season. Even during the monsoon, the progress of the disease is checked during a long break. The annual recurrence of the disease on the stem has not been found to originate from the infected areas

of the previous year, but has been observed to be due to fresh infection. On an infected area the disease spreads downward, following the tapping cut; if tapping is stopped the spreading of the disease is stopped. This is what would be expected from the discovery that the trouble is caused by a parasitic fungus. The fungus, however, lies dormant when tapping is stopped during the monsoon, and resumes its activity when tapping is recommenced any time during the rainy period.

The fungus spreads most rapidly in wet weather, and it is pointed out that closely planted trees, which create a dark, moist atmosphere, favor the disease. This leads the author to suggest that one of the best methods of control is to thin out the trees so as to let in more light and air. The application of fungicides, like Burgundy Mixture, was a failure, though a 20 per cent solution of carbolinum is said to have been a success in Java. Cessation of tapping at the first appearance of the disease, and collection and destruction of all diseased fruits, are recommended by the author as practical means of control. The latter is, however, a difficult procedure in rubber estate practice and requires much labor.

Commenting on this report, the "Planters' Chronicle" says that in South India it has been found that a combination of cessation of tapping on attacked trees, with the application of a thin smear of a mixture of tar and tallow applied to the diseased spot, has proved very effective. The mixture is applied with the finger and then rubbed with a small piece of gunny cloth, so as to confine the smear to the bark area attacked. Its action appears to be twofold. The tar acts as an antiseptic, while the tallow forms a waterproof covering, and thus deprives the fungus of the moisture so necessary for its growth and welfare. After the monsoon, the treated areas gradually shed a thin scale of tar-coated bark and expose a clean, healthy surface beneath.

Covering the tapped surface with a mixture of cowdung, clay and sulphur has also been found beneficial; the bark renews quickly and well enough beneath this covering, and the bark rot is reduced. The mixture may be best made by boiling one ounce of sulphur in half a kerosene tin of water and adding equal parts of clay and cowdung till a thick paste is obtained. The addition of a pinch of salt tends to keep the mixture moist and to prevent it from cracking, after application. This mixture is chiefly applied in the dry weather. It prevents the tapped area drying out and promotes good bark renewal. It appears also to have a beneficial effect, as far as bark rot is concerned, when the rains begin. In Ceylon the mixture is applied each month, within a quarter of an inch of the tapping cut, but in South India it is usually applied over the tapped area when tapping ceases, as it does in some districts, on account of the dry weather.

It is interesting to note that the mycologist in Burma has been successful in inoculating healthy trees with the disease, whereas, in Ceylon, experiments undertaken by the Ceylon Committee of Agricultural Experiments did not show the same result. Working on this disease in Ceylon, Mr. Bryce was inclined to attribute it to a physiological effect, and not to fungus disease at all. Mr. Bryce failed in his attempts to inoculate trees with the disease, and his theory was, apparently, that in wet weather the formation of the cork layer which protects the cells of the inner tissue, and of the wood cambium, was delayed. This causes cells to die locally, and the decomposition products thus set free infiltrate into the neighboring cells and kill them. It may be that the black thread disease in Burma is different in nature from the "bark rot" disease of Ceylon plantation *Hevea*; however, Mr. Dastur is to be congratulated for having definitely proved this disease in Burma to be due to the presence of a fungus, as the first real step towards the control of plant disease is to discover to what it is due.

THE ISLAND OF HAINAN, CHINA, WILL SOON NEED RUBBER machinery in order to bring its plantation product up to the standard qualities in the Singapore market.

Recent Patents Relating to Rubber.

THE UNITED STATES.

ISSUED SEPTEMBER 19, 1916.

- N** 1,188,447. Tire with puncture tube comprising a series of bellows-like cells. J. A. Horgan, Kansas City, Mo.
- 1,188,448. Automobile tire. A. G. Helen, Northfield, Mass.
- 1,198,552. Automobile emergency tread. G. D. Hutchinson, Pavilion, N. Y.
- 1,198,634. Pneumatic tire with armored tube. C. P. Hedley, San Francisco, Calif.
- 1,198,687. Inflatable mattress, pillow, cushion, and upholstery. H. I. Williams, Barberton, and E. L. Bechtel, Akron—both in Ohio.
- 1,198,688. Collapsible tire alarm. G. F. Young, Indianapolis, Ind.
- 1,198,742. Self-retaining rectal tube. C. W. Meinecke, East Orange, N. J., assignor to Meinecke & Co., New York City.
- 1,198,747. Tire casing with inner springs. B. C. Mudge, North Brookfield, Mass.
- 1,198,812. Armored pneumatic tire. A. Baigne, assignor of one-half to Anna Bric—both of Montreal, Quebec, Canada.
- 1,198,927. Horse shoe pad. I. Kempshall, Washington, D. C.
- 1,198,947. Orthopedic device consisting of a tubular soft rubber cushion for the great toe. A. L. Murphy, New York City.
- 1,198,950. Self-ink fountain pen. J. H. Palmer, Jersey City, N. J.
- 1,199,003. Closure for hot water bottles. O. M. Gottesman, New York City.
- 1,199,005. Nursing bottle and nipple. W. B. Worlock, Rome, assignor of one-half to C. E. Kelley, Buffalo—both in New York.
- 1,199,037. Elastic for suspenders. W. C. Holiday, Wekiwa, Fla.

ISSUED SEPTEMBER 26, 1916.

- 1,199,078. Garment supporter loop comprising an elastic pad. G. I. Jerolds, Cheshire, Conn.
- 1,199,144. Rubber tissue in making wigs. Zan Zan, Los Angeles, Calif.
- 1,199,236. Puttee or spat having a main portion of elastic material. J. Boyd, Clonbur, Galway, Ireland.
- 1,199,264. Pneumatic tire. H. E. Grabau, Long Island City, N. Y.
- 1,199,456. Rubber brush for bottle cleaning machines. O. Eick, St. Louis, Mo.
- 1,199,509. Wind shield cleaner with a rubber strip. W. F. Tesnow, Chicago, Ill.
- 1,199,562. Tire protector. C. Jordan, Pittsburgh, Pa.
- 1,199,644. Inner tube ends mechanically joined within the casing. C. S. Wert, Kendallville, Ind.
- 1,199,660. Demountable rim. C. Braniff, Cincinnati, Ohio.
- 1,199,670. Massage apparatus for attachment to a sewing machine. B. L. Davis, Detroit, Mich.
- 1,199,686. Tire clamp. H. J. Geake, Victoria, British Columbia, Canada.
- 1,199,698. Antiskid-chain. A. J. Heinsius, Charlevoix borough, assignor of one-half to C. C. Dieter, Pittsburgh—both in Pennsylvania.
- 1,199,703. Combination inflatable life saving and swimming device. G. W. Johnston, St. Joseph, Mo.
- 1,199,717. Tire filler. D. H. Shapiro, Montreal, Quebec, Canada.

ISSUED OCTOBER 3, 1916.

- 1,199,789. Electrical conductor. M. Hochstadter, Harrisburg, Pa.
- 1,199,817. Rubber heel. E. T. Packard, Avon, Mass.
- 1,199,826. Hose clamp. A. F. Schroeder, Cleveland, Ohio.
- 1,199,837. Shaving brush. C. E. Thompson, assignor of one-half to F. H. Wager—both of Troy, N. Y.
- 1,199,859. Rim for metallic vehicle wheel. E. K. Baker, assignor to Universal Rim Co.—both of Chicago, Ill.
- 1,199,892. Pneumatic tire. E. H. Herrick, New York City.
- 1,199,902. Rubber heel in which is embedded a coiled spring. E. Kempshall, Washington, D. C.
- 1,199,914. Leg warming boot comprising an inner waterproof stocking. W. O. Mossor, assignor of one-half to P. S. Williams—both of Leesville, W. Va.
- 1,199,993. Fountain pen with a collapsible ink sack. G. M. Kraker, assignor to Kraker Pen Co.—both of Kansas City, Mo.
- 1,200,015. Bead, etc. M. Paridon, assignor of one-half to H. A. Rudd—both of Barberton, Ohio.
- 1,200,031. Pneumatic tire shoe. H. A. Rudd, assignor of one-half to M. Paridon—both of Barberton, Ohio.
- 1,200,237. Emergency tire. V. E. Reichard, Perry, N. Y.
- 1,200,255. Auxiliary metal tire for wheels. W. A. Steele, Los Angeles, Calif.
- 1,200,291. Cushion tire comprising a metal shoe and rubber tube. C. F. Adams, Pavo, Ga.
- 1,200,355. Tire protector. J. O. Howard, Austin, Texas.
- 1,200,358. Tire valve. C. A. Iorns, St. Louis, Mo.
- 1,200,418. Self-inflating tire. J. Fernandez, Brownsville, Texas.

ISSUED OCTOBER 10, 1916.

- 1,200,566. Demountable tire. R. Wright, assignor of one-half to F. J. Bommer, Jr.—both of Cleveland, Ohio.
- 1,200,596. Rubber tooth brush which slips over the finger. J. A. Daly, New Rochelle, N. Y.

- 1,200,600. Bottle cleaner. J. Freed, assignor to E. Schwarz—both of Chicago, Ill.
- 1,200,616. Life-saving device. R. W. Hudson and H. B. Spencer, assignors of one-fourth to R. W. Nichol, all of Ottawa, Ontario, Canada, and one-fourth to A. E. Hudson, Calgary, Alberta, Canada.
- 1,200,623. Tire valve. H. P. Kraft, Ridgewood, N. J.
- 1,200,671. Tire protector. L. L. Warr, Malden, Mass.
- 1,200,779. Platen for typewriting machine. W. A. Thompson, Belleville, Ill.
- 1,200,807. Antiskidding tire protector. A. L. Burdt and J. Taylor, Chardon, Ohio, assignors of three-fourths to said Burdt and one-fourth to said Taylor.
- 1,200,874. Combination of a tire and an inflating pump connected directly thereto. G. E. R. Rothenbuecher, New York City.
- 1,200,933. Inflatable life-saving and swimming belt. I. Fraki and W. A. Merila, Hancock, Mich.
- 1,201,045. Closure device for toy balloons. R. Head, New York City, assignor to Howe Baumann Balloon Co., Newark, N. J.
- 1,201,089. Demountable rim. H. J. Parker and J. R. Bradford, San Francisco, assignors of one-half to L. P. Woodbury, Berkeley—both in California.
- 1,201,117. Vehicle wheel rim. J. H. Wagenhorst, assignor of one-fifth to the Goodyear Tire & Rubber Co.—both of Akron, Ohio; two-fifths to The B. F. Goodrich Co., and one-fifth to the United States Tire Co.—both of New York City.
- 1,201,118. Vehicle wheel rim. J. H. Wagenhorst, assignor of one-fifth to the Goodyear Tire & Rubber Co.—both of Akron, Ohio; two-fifths to The B. F. Goodrich Co., and one-fifth to the United States Tire Co.—both of New York City.
- 1,201,119. Vehicle wheel rim. J. H. Wagenhorst, assignor of one-fifth to the Goodyear Tire & Rubber Co.—both of Akron, Ohio; two-fifths to The B. F. Goodrich Co., and one-fifth to the United States Tire Co.—both of New York City.
- 1,201,120. Vehicle wheel and rim therefor. J. H. Wagenhorst, assignor of one-fifth to the Goodyear Tire & Rubber Co.—both of Akron, Ohio; two-fifths to The B. F. Goodrich Co., one-fifth to the United States Tire Co.—both of New York City, and one-fifth to the United Rim Co., a corporation of Ohio.
- 1,201,121. Vehicle wheel rim. James H. Wagenhorst, assignor of one-fifth to the Goodyear Tire & Rubber Co.—both of Akron, Ohio; two-fifths to The B. F. Goodrich Co., one-fifth to the United States Tire Co.—both of New York City, and one-fifth to the United Rim Co., a corporation of Ohio.
- 1,201,122. Vehicle wheel rim. James H. Wagenhorst, assignor of one-fifth to the Goodyear Tire & Rubber Co.—both of Akron, Ohio; two-fifths to The B. F. Goodrich Co., and one-fifth to the United States Tire Co.—both of New York City.
- 1,201,129. Demountable rim. L. P. Woodbury, Berkeley, assignor of one-half to J. T. Parker, San Francisco—both in California.
- 1,201,198. Dust cap for tire valves. H. P. Kraft, Ridgewood, N. J.
- 1,201,199. Dust cap for tire valves. H. P. Kraft, Ridgewood, N. J.

THE UNITED KINGDOM.

PATENT SPECIFICATIONS PUBLISHED.

In order to give the public the advantage of having abridgments of specifications up to date while retaining their numerical sequence, applications for patents made subsequent to 1915 are given new numbers when their complete specifications are accepted, or become open to public inspection before acceptance. The new numbers start with No. 100,001 (without any indication of date), and supersede the original application numbers in all proceedings after acceptance of the complete specifications.

[ABSTRACTED IN THE ILLUSTRATED OFFICIAL JOURNAL, SEPTEMBER 6, 1916.]

- 7,192 (1915). Waders. D. Grant, 122 George street, Edinburgh.
- 7,193 (1915). Armored diving dress. W. P. Thompson, 6 Lord street, Liverpool.
- 7,194 (1915). Diver dress suits with rubber packing rings. W. P. Thompson, 6 Lord street, Liverpool.
- 7,228 (1915). Waterproof cloth recompression chamber for the treatment of divers overcome by excessive pressure. H. Dragerwerk and B. Drager, 53 Moisliger Allee, Lubeck, Germany.
- 7,285 (1915). Top lift for heels made from rubber, gutta percha, or a mixture of cork and rubber solution. Soc. Francaise Du Cuir Arme, 57 rue Alexandre Dumas, Paris.
- 7,296 (1915). Artificial foot which comprises a rubber block. A. Smith, 47 Bachelor Lane, Horsforth, Yorkshire.
- 7,368 (1915). Ladies' garter consisting of connecting straps above and below the knee. E. H. Reid, Chaldon Hill, Ellinbank, Victoria, Australia.
- 7,408 (1915). Reservoir pens. C. Bristow, 20 St. German's Road, Forest Hill, London.
- 7,464 (1915). Rubber heel core for artificial feet. J. F. Rowley, 25 West Madison street, Chicago, Ill.
- 100,874. Tire armor. J. K. Black, 22 Glen street, Paisley, Renfrewshire.

[ABSTRACTED IN THE ILLUSTRATED OFFICIAL JOURNAL, SEPTEMBER 13, 1916.]

- 7,536 (1915). Puttee having a woven elastic section. J. Boyd, Ebor Hall, Clonbur, Galway, Ireland.
- 7,538 (1915). Washer made of rubber and fabric. F. H. Rogers, Broad Sanctuary Chambers, Westminster.

- 7,670 (1915). A map for use either as a plane or spherical map comprising elastic material. E. A. Reeves, Royal Geographical Society, Kensington Gore, London.
- 7,721 (1915). Fountain pen. F. Oliver, Clifton street, Stourbridge.
- *7,790 (1915). Braysiere formed of a number of strips of elastic material. E. Guggenheim, 252 West Twenty-ninth street, New York City.
- 7,810 (1915). Life buoy with rubber diaphragm and bands. P. De Luca, Scuola Allievi Uciali Royal Carabinieri, Rome, Italy.
- 7,816 (1915). Tire valve. J. Huybrechts, Mortsel-les-Anvers, Belgium.
- *100,897. Clamping device for pneumatic tires. P. J. Cuddihy, P. O. Box 92, Rutherford, N. J.
- *100,905. Detachable rim attachments. I. D. Walter, J. Brinkerhoff, E. F. Cole, J. G. Gant, T. Flournoy, J. W. Gant and S. A. Latimer, Harrisburg, Arkansas.

[ABSTRACTED IN THE ILLUSTRATED OFFICIAL JOURNAL, SEPTEMBER 20, 1916.]

- 7,930 (1915). Combined waterproof cape and ground-sheet. J. G. Savagar, 43 Brompton Road, London.
- 8,007 (1915). Rubber set brush. Brush Co., 21 Bucklersbury, London, and A. H. Timmis, "Fairmount," Harrow View, Harrow, Middlesex.
- *8,029 (1915). Tire valves. R. H. Henemier, 501 West 138th street, New York City.
- *8,036 (1915). Flanged wheels with rubber cushions. E. C. Madden, 1180 Broadway, New York City.
- *8,054 (1915). Detachable rim. E. P. Calvin, Sardinia, Ohio.
- 8,118 (1915). Dolls, figures, toy animals and similar articles comprising a rubber bladder. H. S. Dean, 160a Fleet street, London.
- 8,165 (1915). Repairing pneumatic tires by wrapping with rubberized tape. W. A. Leslie, Central Hotel, Short Market street, Cape Town, South Africa.
- *100,973. Springwheels with solid rubber tires. A. J. Anderson, 1340 Park avenue, Chicago, Ill.
- 101,018. Tire valves. Naamloze Vennootschap Holland Ventiel, Heelsun, near Arnhem, Holland.

[ABSTRACTED IN THE ILLUSTRATED OFFICIAL JOURNAL, SEPTEMBER 27, 1916.]

- 8,228 (1915). Solid tire and attaching means. T. Gare, Cumberland House, Park Lane, Wembley, Middlesex.
- 8,390 (1915). Raft formed of tubular vessels of flexible rubbered materials. A. Candelon, 40 Rue de la Republique, St. Mandé (Seine), France.
- *8,511 (1915). Rubber-covered spring for vacuum bottles. E. C. R. Marks, 57 Lincoln's Inn Fields, London. (Landers, Frary & Clark, New Britain, Connecticut.)
- 8,533 (1915). Jar ring. H. Hartmann, Globus, Gummi und Asbestwerke Ges., Ahrensbock, Germany.
- *101,028. Inflatable life preserver. B. Franklin, 2118 North Kostner Avenue, Chicago, Ill.
- 101,040. Life-saving belt or swimming appliance comprising a number of permanently inflated rubber balls. H. Brookes, 307 Pershore Road, Stirlchley, Birmingham.
- 101,054. Detachable rim. W. M. Douglas, 6 Bean street, Waterford.

[ABSTRACTED IN THE ILLUSTRATED OFFICIAL JOURNAL, OCTOBER 4, 1916.]

- 8,627 (1915). Tire rim attachments. H. W. Van Meeteren, 58 Poplar Road, Edgbaston; A. Edwards, 44 Milcote Road, Bearwood, and H. Headley, "Merton," Oxford Road, Moseley—all in Birmingham.
- 8,727 (1915). Attaching block ties to rims. Mail Motors, Limited, and J. B. Gould, 3 The Crescent, Birmingham.
- *8,756 (1915). Tennis or other inflated playing ball. R. H. Rosenfeld, 1895 East 71st street, Cleveland, Ohio, and F. T. Roberts, 17 Lee avenue, Trenton, N. J.
- 8,787 (1915). Apparatus for saving life for use in combination with water-tight suit. R. D. Buchanan, 7 Hendon street, Hexham, Northumberland.
- 8,827 (1915). Pneumatic tire cover of rubber, canvas and leather. J. B. Salmon, Pilleul street, Dunedin, New Zealand.
- 8,909 (1915). Respirator head-piece comprising rubber disks and bands. W. Single, The Grove, Woodford, Essex.
- 8,950 (1915). Cushion tire. W. E. H. Humphrys, Cranbourne Lodge, Hendon, Middlesex.
- *101,065. Puncture closer consisting of a head and cap of soft rubber, etc. R. W. Sampson, Melba, New York.
- 101,074. Rubber strips in a device for turning the legs of high-legged boots. F. Ricks and British United Shoe Machinery Co., Union Works, Belgrave Road, Leicester.
- *101,096. Air tube for tires. N. C. Doss, Rome, Georgia.

THE DOMINION OF CANADA.

ISSUED JULY 31, 1916.

- 170,488. Inflatable life preserver. The American Life Buoy Co., assignee of B. Franklin—both of Chicago, Ill.
- 170,493. Rubber sole. The Canadian Consolidated Rubber Co., Limited, assignee of W. B. Wiegand, and T. H. Rieder—all of Montreal, Quebec, Canada.
- 170,494. Hand rail of fabric and rubber for escalators. The Canadian Consolidated Rubber Co., Limited, Montreal, Quebec, Canada, assignee of H. Z. Cobb, Winchester, Mass.
- 170,530. Life-saving garment comprising an inflatable tube. W. R. Pike and T. S. Morton, co-inventors—both of Tuxedo Park, New York.

*Denotes patents for American inventions.

- 170,578. Necktie having a sheet rubber lining. W. Hey, York City, York, England.
- 170,650. Hand rail for escalators comprising a channelled member of vulcanized rubber. Canadian Consolidated Rubber Co., Limited, Montreal, Quebec, Canada, assignee of H. Z. Cobb, Winchester, Mass.
- 170,772. Air hose coupling. J. Roy, Los Angeles, Calif.
- 170,898. Gutta percha and rubber tire patch. J. G. Moomy, Erie, Pa.
- 170,967. Tire valve. A. Schrader's Son, assignee of R. H. Henemier—both of New York City.
- 170,963. Tire valve. A. Schrader's Son, assignee of R. H. Henemier—both of New York City.
- 171,002. Tire cover. T. Bélair, Montreal, Quebec, Canada.
- 171,007. Repair heel for rubber overshoe. J. Capdevila, New York City.

NEW ZEALAND.

ISSUED AUGUST 17, 1916.

- 36,659. Milking machine teat cup. The Ridd Milking Machine Co., Limited, Queen street, assignee of A. Ridd—both of New Plymouth, New Zealand.

ISSUED AUGUST 31, 1916.

- 36,986. Waterproof life buoy. J. B. Adams, Christchurch, N. Z.
- *37,103. Molded inner tube for pneumatic tires, characterized by having a fixed formation when deflated. H. C. Boggs and C. E. Frost—both of Athens, Alabama.

FRENCH REPUBLIC.

PATENTS ISSUED (With Dates of Application).

- 480,007 (October 15, 1915). Improvements in detachable tires. J. H. Coffey and J. H. Coffey, Jr.
- 480,025 (January 25). Articulated metal tread band for wheels of vehicles equipped with dual elastic tires. Société Schneider & Cie.
- 480,144 (October 20). Protection plates for rubber tires and tires made of similar elastic materials. B. C. Gray.
- 480,166 (July 29). Special tire for automobiles. K. Pauli and Mme. Benninger.
- 480,259 (November 18). Improvements in rubber pads and findings for heels and soles of footwear. W. W. Phillips.
- 480,306 (November 24). Article to repair rubber hose by vulcanizing. A. B. Low.
- 480,363 (November 30). Anti-skid device for pneumatic tires. G. N. Givone.
- 480,387 (December 3). Vehicle tire. F. Lotter.
- 480,441 (December 14). Sectional pneumatic tire. G. M. Chanler.

TRADE-MARKS.

THE UNITED STATES.

- 94,243. Padlock design composed in part of a tire, and the words BATAVIA SECURITY TIRES—rubber tubes and tires. The Batavia Rubber Co., Batavia, N. Y.
- 94,091. The word LUSTRE—red mason-jar rings. R. E. Tongue & Bros. Co., Philadelphia, Pa.
- 96,225. The word PRESERVE in combination with preparation of rubber. S. A. Conover, Philadelphia, Pa.
- 96,884. The words PAN AMERICAN—rubber tires and tubes for automobiles, aeroplanes, trucks and the like. Automobile Sundries Co., New York City.
- 79,127. The words BOSTON BELLE—rubber shoes, clothing, etc. The Tremont Stores, Inc., Boston, Mass.
- 96,233. The words and numeral BRUNSWICK No. 3—billiard-cloth. The Brunswick-Balke-Collender Co., Chicago, Ill.
- 82,334. The words and numeral BRUNSWICK No. 4—billiard-cloth. The Brunswick-Balke-Collender Co., Chicago, Ill.
- 94,090. The words BIG CHIEF—fruit jar rings. R. E. Tongue & Bros. Co., Philadelphia, Pa.
- 96,267. An illustration of a beehive with the letter B—the tape, rubber and adhesive patches. Berrodin Rubber Co., Philadelphia, Pa.
- 96,269. The words AGENTS QUALITY and pneumatic tires, rollers, blow-out patches and tire patches composed of rubber, etc. Shadbolt & Boyd Iron Co., Milwaukee, Wis.
- 96,573. A representation of a roll of brake lining with a series of white transverse marks placed at regular intervals along the face of the brake lining—brake lining. Standard Woven Fabric Co., Woburn, Mass.
- 96,595. The word DESKTOP formed in a full circle over the letter A—insulated wire and cables. The Okonite Co., New York City.
- 96,596. The word DESKTOP formed in a half circle over the letter B—insulated wire and cables. The Okonite Co., New York City.
- 96,950. The numerals and word 2 in 1—rubber axle supports. H. J. Collis, Taunton, Mass.
- 95,880. Representation of a tire with the word PROOF in the center—tire-sealing compound. Cline, Crowell & McCorkle, Newton, N. C.
- 96,854. The word RAYNSTER—rain-coats. United States Rubber Co., New Brunswick, N. J.

THE DOMINION OF CANADA.

- 21,858. Representation of a hydrotank and the words MADE IN CANADA—waterproof and showerproof garments including headwear. Canadian Consolidated Rubber Co., Limited, Montreal, Quebec, Canada.

THE UNITED KINGDOM.

- 371,918. The word NICK rubber erasers. Gelindens Rijkers, Amsterdam, Holland.
- 371,957. The word ELK enclosed in a circle with a drawing of the animal of the same name—composition in the nature of a packing. Leicester Castings & Engineering Co., Leicester.
- 372,159. A monogram composed of the letters B. R. M.—rubber fuse cases. British Rubber Manufacturers, Limited, Agnes Works, Agnes Road, Acton, London, W.
- 372,580. The word NORTON Beltings. Aktieselskap Den Norske Remfabrik, Christiania, Norway.
- 372,817. The word IMPACTOR apparatus for registering the properties of the flight of golf balls. Charles Guthrie Guthrie, Glasgow.
- 373,018. The words BRITONS CUR—rubber heels, tips and pads for boots and shoes. Wood-Milne, Limited, Bow Lane, Preston Lancs.
- 373,131. A shield bearing crossed hockey clubs—tobacco pouches of rubber. J. B. Ingred & Son, The London India-Rubber Works, Felsed street, Hackney Wick, London, N. E.
- 373,170. The word VICEROY—braces and sock suspenders of elastic fabric containing rubber. Faire Bros., Limited, Leicester.
- 373,259. The word AUCHTOS—elastic belts and similar articles. Léon Thomas, Paris, France.
- 373,327. The words WATER MILL PAD on the wheel in a picture of a water mill—rubber heel pads for boots and shoes. Rocco Antonio Barilone, Deptford, London, S. E.
- 373,331. The word CLINCHER—all rubber goods included in Class 27. The North British Rubber Co., Limited, Castle Mills, Edinburgh.
- 373,332. The word CLINCHER—all goods included in Class 28—Same.
- 373,333. The word CLINCHER—all goods included in Class 31—Same.
- 373,334. The word CLINCHER—all goods included in Class 32—Same.
- 373,418. The words DANDY LION—packings. James Walker & Co., Limited, Poplar, London, E.
- 374,208. The word ELEPHANT—rubber insulated electric cables. Collender's Cable and Construction Co., London.
- 374,209. The word DAFFODIL—Same.
- 374,211. The word THISTLE—Same.
- 374,212. The word ROSE—Same.

THE FRENCH REPUBLIC.

- 1,310. The words LES CAOUTCHOUCIERS RÉUNIS supplies and sundries made of rubber, such as rubber heels and soles, interior "heel protectors," interior soles, rubber footwear. J. B. Jeuge, Clermond-Ferrand, Puy-de-Dôme.
- 1,311. The word TROTTIN—Same.
- 1,312. The word PATRIA—Same.
- 1,313. The word MIDINETTE—Same.
- 1,314. The word MINET—Same.
- 1,315. The word SCHUI—Same.
- 1,316. The word DUCES—Same.
- 1,317. The word CHATON—Same.
- 1,318. The word C. L. F.—Same.
- 1,319. The word ANGORA—Same.
- 1,320. The word CHAT—Same.
- 1,321. The word CHAMPION—Same.
- 1,322. The word GLOBE—Same.
- 1,382. The word TOURISTE—tobacco pouches. Louis Guichard, Sainte Claude, Jura.
- 4,081. The words Y. A. BEN—rubber nipples and rubber heels: sundry rubber goods. Yves Bourgeois, Nantes, Loire-Inférieure.
- 4,082. The words Y. A. BEN—Same.
- 4,083. The word YARON—Same.
- 9,748. The initials L. A. N.—rubber goods such as tobacco pouches, soles and heels, footwear, waterproof fabrics, erasers, pen holders, etc. Société Lyonnaise de l'Afrique du Nord, Lyon.
- 10,047. The initials D. B.—small pouches containing a thin sheet of rubber and other material for dressing wounds. Madame Claudia Boizet Desroches, Lyon.
- 24,030. The word WOODITE—for rubber and gutta percha goods. Woodite Co., Limited, Mitcham-Common, Surrey, England.
- 24,148. The word DEXINE rubber goods. DEXINE, Limited, DEXINE Works, Abbey Lane, Stratford, London, England.
- 161,654. The word PLASTINE—plastic materials. Société Générale pour la Fabrication des Matières Plastiques, Paris.
- 161,731. The words LE POILU—hard rubber combs. Société E. Maikignac et A. Robineau, Paris.
- 162,031. The words ROUE BLINDÉ—detachable wheels for rubber pneumatic tires to be used on motor vehicles. Société Française des Roues Amovibles, Ivry-Port, Seine.
- 162,196. The word CILFRANC—special rubber tube. Alfred Désiré Gillard, Paris.
- 162,227. The word PANDORE—rubber toys. Mlle. Valentine Thomson, Paris.
- 162,435. The word SIMPLEX—transmission and conveyor belts. Compagnie des Transporteurs Simplex, Paris.
- 162,642. The words MAROC SPÉCIAL—rubber heels. Emile Moyse, Paris.
- 162,643. The words BOSTON HEEL—Same.
- 162,644. The words MASCOTTE SPÉCIALE—Same.
- 162,645. The word PHÉNIX—Same.
- 162,646. The words AMERICAN BLACK INTERIOR rubber heel protector. Emile Moyse, Paris.

DESIGNS.

THE UNITED STATES.

- 49,677. Non-skid tire. H. J. Schluckebier, Frankenmuth, Mich.
- 49,706. Tire tread. H. F. DAVENPORT assignor to Brunswick-Balke-Coller Co.—both of Chicago, Ill.
- 49,714. Non-skid tread. R. J. Stokes, assignor to Thermoid Rubber Co.—both of Trenton, N. J.
- 49,715. Non-skid tread. R. J. Stokes, assignor to Thermoid Rubber Co.—both of Trenton, N. J.
- 49,753. Tire. A. Y. Tucker, Mount Vernon, N. Y.

PRINTS.

- 4,488. WEARING APPAREL AND RUBBER GOODS: the wearing apparel and rubber goods. United States Rubber Co., New Brunswick, N. J., and New York City.

STATEMENT OF THE INDIA RUBBER WORLD.

Statement of the ownership, management, etc., required by the Act of Congress of August 24, 1912, of THE INDIA RUBBER WORLD, published monthly at New York, N. Y., for October 1, 1916.

STATE OF NEW YORK) ss.
COUNTY OF NEW YORK)

Before me, a notary public in and for the State and county aforesaid, personally appeared E. M. MacPhee, who, having been duly sworn according to law, deposes and says that she is the Business Manager of THE INDIA RUBBER WORLD, and that the following is, to the best of her knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 443, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers, are:

Publisher, The India Rubber Publishing Co., 25 West Forty-fifth street, New York City.

Editor, Henry C. Pearson, 83 Agawam Road, Waban, Massachusetts.

Managing Editor, None.

Business Manager, E. M. MacPhee, 25 West Forty-fifth street, New York City.

2. That the owners are (Give names and addresses of individual owners, or, if a corporation, give its name and the names and addresses of stockholders owning or holding 1 per cent or more of the total amount of stock):

Henry C. Pearson, 83 Agawam Road, Waban, Massachusetts.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.) None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by her.

E. M. MACPHEE, Business Manager.

Sworn to and subscribed before me this 30th day of September, 1916.

[SEAL]

FREDR. SPRENGER,

Notary Public, Westchester County.

Certificate filed in New York County.

New York County Clerk No. 188. Register's No. 8226.

(My commission expires March 30, 1918.)

IRON HEEL FOR RUBBER BOOT.

In the October, 1909, issue of THE INDIA RUBBER WORLD appeared an illustrated description of the "7-League" rubber boot, which has a special sewed leather sole. This boot has continued

deservedly popular and now an improvement is offered, the full iron heel here shown. The strength and wearing quality of such a heel is self-evident. It is not at all cumbersome, weighing about the same as a leather heel owing to its hollow construction. Made of malleable iron, it is warranted not to break, and the back of the heel is corrugated in pyramid shape to prevent slipping.



The boot is as well insulated as before, as the screws which hold the heel on do not enter the rubber sole. It is claimed that this heel cannot be pulled off and will not wear out during the life of the boot. [Mulconroy Co., Philadelphia, Pennsylvania.]

Review of the Crude Rubber Market.

Copyright, 1916.

NEW YORK.

THE long period of comparative stagnation that has characterized the New York market for the past four months is unusual in the history of the trade. While the large buyers are supposed to be carrying ample emergency stocks, it was believed that the fall, which is the initial period for selling rubber goods, would see active covering of crude rubber requirements. Lower prices have been confidently expected by the consuming trade, based on the assuring reports of increased production.

The month of October, just passed, has only shown slight evidences of the expected heavy buying movement, and instead of lower prices, the range of values has been, in fact, upward.

The temporary fright occasioned by the nearby German submarine operations was reflected in crude rubber by a sharp advance of 3 to 5 cents on October 9, when war risks went to 5 per cent and grave uncertainty was felt concerning the future of freights and rubber supplies. When the danger subsided, insurance receded to 1½ per cent and in a few days the market had declined about 2½ cents. Easier conditions were in evidence later and lower prices prevailed until the last week of the month, when the market became firmer and prices again took an upward trend. On October 30, First latex spot was 63½ cents, Smoked sheet ribbed, spot, 63 cents, January-June 63½ cents. The market was strong on all grades.

The unusual position of Upriver fine is due to drought and the consequent low water on the Amazon that has prevented the usual arrivals of rubber at this time of the year. Moreover, the supplies necessary for the *seringueros* are being detained by the same cause and will undoubtedly delay the future arrivals of Para sorts. Russian buying is another well-known reason for the strong position of Upriver fine. On October 30 this grade was selling for 81 cents spot in a firm market, futures 79 cents. For a period approximating the first three weeks of October, about 3,465 tons of rubber arrived at the port of New York, divided as follows: Plantation from Ceylon, 1,000 tons; Singapore, 400 tons; London and Liverpool, 600 tons; Para from Brazil, 500 tons; Centrals, 700 tons; Africans, 125 tons; Manicoba, 80 tons; Guayule, 60 tons.

LONDON.

The past month has been, altogether, quiet, with trading confined to dealers' sales and the covering of short requirements. Prices have been generally firm in a gradually advancing market that has recorded gains of about 2 cents during the month. The real buying interests have, however, failed to follow the rise in prices, preferring to take the necessary chances involved. This policy has been also observed in forward sales which have been freely offered here at prices that are too close to spot quotations to be interesting. On October 28, First latex was 59.7 cents, Smoked sheet 56.7 cents, and January-June, 60.2 cents in a strong market.

London imports for September were 6,000 tons, against 4,320 for August. Liverpool imports for September were 1,160 tons, against 1,100 tons for August.

SINGAPORE.

The result of the auctions held September 29, October 6, 12, 20 and 26 was as follows: Pale crépe averaged 54.2 cents and Smoked sheet 53.6 cents. Amount sold, 2,555 tons. For the period from September 8 to 14 inclusive, the export duty on rubber was assessed on a price of 48.8 cents per pound for all grades.

NEW YORK QUOTATIONS.

Following are the quotations at New York one year ago, one month ago, and October 30, the current date:

PARA.	Nov. 1, 1915.	Oct. 1, 1916.	Oct. 30, 1916.
Upriver, fine, new.....	56 @ 57	73 @	81 @
Upriver, fine, old.....	57 @ 58	.....	.....
Islands, fine, new.....	54 @	65 @	72 @
Islands, fine, old.....	55 @	.....	.....
Upriver, coarse, new.....	44 @ 44 1/2	43 @	47 @
Upriver, coarse, old.....	45 @	.....	.....
Islands, coarse, new.....	27 @ 27 1/2	30 @	31 1/2 @
Islands, coarse, old.....	28 @	.....	.....
Cameta	28 @ 29	32 @	32 @
Caucho, ball, upper.....	44 @ 45	44 @	47 1/2 @
Caucho, ball, lower.....	42 @ 43	41 @	44 @ 45

PLANTATION.

First latex			
crêpe.....	{ Spot... 61 1/2 @ 62	{ Spot... 60 @	63 1/2 @
	{ Afloat 60 @ 60 1/2	{ Futures 60 @	63 1/2 @
Amber crêpe, light.....	{ Spot... 57 1/2 @	{ Futures 57 1/2 @	60 @
Brown crêpe, clean.....	{ Spot... 54 @	{ Futures 54 @	58 @
Smoked sheet,			
ribbed.....	{ Spot... 61 1/2 @ 62	{ Spot... 59 1/2 @	63 @
	{ Afloat 60 @ 60 1/2	{ Futures 59 1/2 @	63 @ 63 1/2
Fine sheets and biscuits,			
unsmoked	58 @ 58 1/2	.....	.....

CENTRALS.

Cornu	41 @ 42	42 @	45 @
Esmeralda, sausage	41 @ 42	42 @	44 @
Nicaragua, scrap	40 @ 41	41 @	43 1/2 @
Mexican plantation, sheet	42 @	46 @ 47	45 @
Mexican, scrap	42 @	40 @	42 @
Mexican, slab	30 @	31 @	33 @
Manicoba	30 @ 31	42 1/2 @	32 @ 36
Mangalagu, sheet	30 @ 31	37 1/2 @	31 @ 37
Guayule	32 @	32 @ 33	33 @ 35
Balata, sheet	50 @ 53	70 @	69 @
Balata, block	44 @ 45	65 @	61 @

AFRICAN.

Lopori, ball, prime	53 @ 54	50 @	55 @ 56
Lopori, strip, prime	51 @	51 @	55 @ 56
Upper Congo, ball, red	52 @	51 @	54 @
Rio Nunez Niggers.....	53 @	54 @	55 1/2 @ 56
Conakry Niggers	53 @	52 @	55 1/2 @ 56
Massai, red	52 @	50 @	54 1/2 @ 55
Soudan, Niggers	50 @	.....	.....
Cameroon, ball, soft.....	.....	.....	40 @
Cameroon, ball, hard.....	.....	.....	46 @ 48
Benguela, No. 1 Superior	38 @	38 @	39 @
Benguela, No. 2	30 @	34 1/2 @ 35	41 1/2 @
Accra, flake .....	.....	28 @	33 @

EAST INDIAN.

Assam	47 @	48 @	41 @
Pontiang	60 @	80 @	80 @
Gutta Slak	11 @ 12	13 @	13 @
Gutta, red Niger .....	.....	60 @	26 1/2 @
Borneo III .....	.....	.....	.....
Gutta Percha, red Macassa	2.50 @	100 @	1 88 @

MARKET CABLE SERVICE FROM LONDON.

The following market report has been cabled from Aldens' Successors, Limited, London:

	Standard	Smoked	Quiet.
October 9	55.9	55.4	Firm.
October 9	58.6	57.9	Firm.
October 16	57.9	57.0	Easier.

MARKET CABLE SERVICE FROM SINGAPORE.

The following reports of the weekly auctions held at Singapore have been cabled by The Waterhouse Co., Limited:

Date.	Crêpe. Price per lb.	Smoked Sheet. Price per lb.	Pounds Sold.	Market.
Sept. 29, cents	52.7	52.2	1,127,920	Good demand for all descriptions.
Oct. 6	53.1	52.7	1,111,040	Good demand for all descriptions.
Oct. 12	55.2	54.8	1,048,320	General and active demand.
Oct. 20	54.4	53.5	891,526	Flat.
Oct. 26	55.6	54.8	1,444,800	Active at the advance.

RESULTS OF AUCTIONS HELD IN SINGAPORE DURING THE FIRST HALF OF 1916.

QUANTITIES OFFERED AND SOLD.				PRICES REALIZED, PER POUND.								
Date.	Offered.		Sold.		SMOKED SHEET.				UNSMOKED SHEET.			
	Pounds.	*Picks.	Pounds.	*Picks.	Fine Ribbed.	Good Ribbed.	Fine Plain.	Good Plain.	Fine Ribbed.	Good Ribbed.	Fine Plain.	Good Plain.
January 1.....	43,750	65,188	3,341.11	44,614	\$100 a 103	\$100 a 104	\$100 a 103	\$187 a 189	\$118 a 119	— a —	\$187 a 190	\$165 a 186
" 8.....	44,548	48,648	1,708.66	2,774.41	180 a 187	170 a 181	175 a 180	— a —	160 a 170	— a 167	165 a 167	— a —
" 15.....	80,470	74,160	4,777.11	7,729.4	180 a 191	170 a 179	170 a 183	167 a 169	160 a 170	158 a 156	160 a 161	— a —
" 22.....	41,876	86,801	4,781.97	60,406	170 a 184	170 a 174	166 a 170	— a —	165 a 170	160 a 164	163 a 167	158 a 159
Totals	20,677.44	2,756,991	13,838.35	1,845,111								
February 1.....	3,534.68	471,290	2,671.19	356,158	146 a 155	140 a 145	143 a 145	136 a 138	138 a 144	— a —	140 a 144	— a —
" 8.....	8,863	4,586.1	4,586.1	60,468	165 a 174	160 a 164	164 a 166	— a —	163 a 167	159 a 169	158 a 166	147 a 148
" 15.....	7,782	76,782	3,908.44	523,792	184 a 197	170 a 192	184 a 189	— a —	175 a 175	— a 169	— a 165	— a —
" 23.....	6,923.51	923,134	4,464.14	595,218	171 a 181	153 a 170	165 a 166	— a 156	162 a 165	145 a 153	139 a 150	— a —
Totals	21,197.69	2,826,356	15,619.78	2,082,636								
March 1.....	8,258.99	1,101,198	4,691.03	625,470	178 a 185	170 a 177	170 a 176	165 a 168	161 a 164	— a —	160 a 168	— a 153
" 8.....	8,287.62	1,105,016	6,449.81	859,974	180 a 187	174 a 179	170 a 176	164 a 166	164 a 169	— a 163	161 a 170	148 a 156
" 15.....	6,929.00	923,866	5,869.10	782,546	180 a 187	173 a 180	170 a 179	164 a 169	169 a 174	161 a 168	168 a 171	150 a 167
" 22.....	6,200.11	826,681	3,725.45	496,726	178 a 184	169 a 178	170 a 176	161 a 166	164 a 167	— a —	159 a 163	146 a 158
" 29.....	6,732.04	897,605	5,159.56	687,941	180 a 189	175 a 179	171 a 179	— a —	170 a 172	163 a 167	169 a 172	154 a 168
Totals	36,407.76	4,854,366	25,894.95	3,452,657								
April 5.....	4,939.76	658,634	2,949.85	393,313	176 a 181	170 a 175	170 a 176	— a —	160 a 164	— a —	157 a 162	— a —
" 12.....	7,457.16	994,288	4,796.86	639,581	175 a 182	168 a 175	173 a 175	— a 165	163 a 168	159 a 160	155 a 165	— a —
" 19.....	5,891.12	785,482	3,894.29	518,905	168 a 174	162 a 167	164 a 168	160 a 162	160 a 168	157 a 159	157 a 162	145 a 151
" 27.....	7,283.32	971,109	4,575.69	610,092	165 a 171	157 a 163	159 a 165	— a —	154 a 159	— a —	156 a 158	— a 152
Totals	25,571.36	3,409,513	16,216.69	2,161,891								
May 3.....	5,015.29	668,705	2,777.77	370,369	152 a 162	150 a 159	150 a 156	— a —	— a 147	— a —	150 a 153	140 a 149
" 10.....	5,824.34	776,578	3,142.54	419,005	140 a 149	135 a 140	135 a 138	— a —	134 a 137	— a —	129 a 135	117 a 125
" 18.....	6,085.53	811,404	4,523.47	603,129	137 a 144	132 a 137	135 a 139	— a —	131 a 138	— a —	130 a 132	— a 126
" 24.....	6,468.05	862,406	4,969.26	662,568	139 a 143	133 a 138	136 a 140	— a —	132 a 134	— a 125	130 a 138	120 a 130
" 31.....	6,273.26	836,434	4,961.96	661,594	131 a 134	126 a 130	128 a 132	— a 125	123 a 127	— a —	125 a 131	— a 117
Totals	29,666.47	3,955,527	20,375.00	2,716,665								
June 7.....	5,447.50	726,333	4,490.13	598,684	134 a 138	130 a 133	131 a 137	128 a 130	126 a 128	— a —	129 a 132	123 a 126
" 15.....	6,722.30	896,306	5,036.51	671,534	122 a 129	117 a 123	120 a 123	118 a 119	120 a 124	117 a 118	118 a 127	115 a 116
" 21.....	6,569.73	875,964	4,978.03	663,737	123 a 127	118 a 122	120 a 122	— a 117	115 a 116	109 a 110	111 a 115	104 a 110
" 28.....	6,353.72	833,829	5,515.01	735,334	118 a 121	112 a 114	110 a 114	107 a 108	106 a 110	— a —	105 a 109	— a —
Totals	25,093.25	3,332,432	20,019.68	2,669,289								
Grand Totals..	158,513.97	21,135,185	111,964.45	14,928,249								

CREPE.

1916.		Fine Pale.	Good Pale.	Pale Blanket.	Brown Blanket.	Fine Brown.	Good Brown.	Good Dark.	Barky.	Virgin and Pressed.	Loose.
January	5	\$205@210	\$202@205	\$—@197	\$190@192	\$190@198	\$170@189	\$165@179	\$150@171	\$109@111	\$—@111
"	12	184@186	179@183	—@183	178@180	177@183	170@178	147@169	120@157	112@127	75@107
"	19	188@195	179@188	—@189	—@—	177@184	164@177	150@170	139@161	95@134	84@88
"	26	181@185	175@180	—@—	165@172	171@177	159@170	147@159	137@156	101@130	111@138
February	1	149@157	142@147	—@150	143@144	140@146	136@143	123@141	116@136	90@93	—@—
"	8	163@173	168@170	—@163	—@160	160@169	153@163	140@159	136@152	117@138	94@133
"	16	191@197	187@194	186@190	181@184	175@189	170@180	160@175	131@167	110@155	75@147
"	23	177@182	173@176	—@—	—@—	168@175	154@167	139@154	120@145	95@121	80@120
March	1	184@186	175@184	176@179	175@176	174@180	150@173	154@165	125@161	110@137	—@137
"	8	184@187	181@184	180@181	167@180	170@180	163@168	151@167	120@163	114@140	80@146
"	15	187@189	185@186	—@—	176@179	171@180	165@175	150@169	126@158	90@118	111@132
"	22	181@184	179@182	—@173	160@169	171@176	161@170	137@157	115@147	—@137	85@110
"	29	184@188	178@183	—@—	173@178	170@178	160@170	150@163	131@154	118@140	30@138
April	5	179@180	177@178	—@—	168@177	168@176	158@167	143@157	130@148	116@127	—@94
"	12	178@183	174@177	170@176	165@170	170@175	155@169	145@159	127@148	117@132	102@121
"	19	173@178	166@170	162@166	—@—	157@167	152@161	140@151	112@145	104@110	85@119
"	27	175@179	170@174	—@172	156@163	157@160	147@157	135@145	110@139	103@121	—@80
May	3	160@161	145@160	151@153	—@—	142@152	137@141	118@137	90@127	108@125	70@93
"	10	150@159	139@150	—@—	—@—	125@133	115@129	107@125	75@110	83@90	60@95
"	18	146@150	135@144	134@138	134@137	129@137	114@127	100@120	75@108	75@110	—@106
"	24	144@147	137@143	—@139	—@136	128@137	120@127	109@124	81@118	85@110	86@108
"	31	135@139	131@134	—@134	—@—	128@131	120@125	99@119	76@110	80@90	—@80
June	7	137@140	132@135	130@132	124@128	130@132	119@129	103@120	80@111	95@103	50@94
"	15	128@130	122@128	—@126	—@120	120@125	110@119	90@114	70@94	55@101	53@85
"	21	125@131	123@128	122@124	114@118	116@120	107@116	95@113	68@105	60@91	—@52
"	28	121@123	112@120	114@117	—@—	107@114	97@105	78@95	55@87	81@86	50@77

Highest Prices Realized:				First Half Year	Total Quantities Offered.			Total Quantities Sold.			
	1913.	1914.	1915.	1916.	Recapitulation.	Pounds.	*Piculs.	Tons.	Pounds.	*Piculs.	Tons.
Sheet, smoked fine ribbed		†\$141	†\$204	†\$203	1912	1,341,472	10,061.04	599	1,169,262	8,769.47	522
Sheet, smoked good ribbed	†\$249	135	188	184	1913	3,797,501	28,481.27	1,695	3,379,168	25,343.76	1,508
Sheet, smoked fine plain		132	165	193	1914	8,254,594	61,909.45	3,685	5,973,179	44,798.85	2,666
Sheet, smoked good plain			183	189	1915	24,968,834	187,611.45	11,167	16,401,788	123,523.44	7,322
Sheet, unsmoked fine ribbed			182	190	1916 (half year)	21,135,185	158,513.97	9,435	14,928,249	111,964.45	6,619
Sheet, unsmoked good ribbed	237	129	178	167	GUTHRIE & CO., LIMITED, Singapore, report [September 14, 1916]: The following was the course of values:						
Sheet, unsmoked fine plain		130	180	190							
Sheet, unsmoked good plain		127	186	170							
Crêpe, fine pale thin		146	209	210					Sterling equivalent	per pound	Equivalent
Crêpe, good pale thin	245	139	208	205					in London.	in cents.†	
Crêpe, good pale blanket			195	197							
Crêpe, good brown blanket			183	192	Sheet, fine ribbed smoked	111¢/120	2/ 3 7/8 @ 2/ 4 3/4	56.50 @ 58.28			
Crêpe, fine brown	221	133	190	198	Sheet, good ribbed smoked	111 @ 115	2/ 2 3/4 @ 2/ 3 5/8	54.22 @ 56.00			
Crêpe, good brown		124	179	189	Sheet, plain smoked	105 @ 111	2/ 1 1/4 @ 2/ 2 1/4	51.70 @ 54.22			
Crêpe, good dark	191	122	171	179	Sheet, ribbed unsmoked	107 @ 108	2/ 2 @ 2/ 2 1/8	52.70 @ 52.95			
Crêpe, baky	180	111	157	171	Sheet, plain unsmoked	100 @ 106	2/ 0 1/2 @ 2/ 1 1/4	49.66 @ 52.20			
Scrap, virgin and pressed	201	108	120	111	Crêpe, fine pale	117 @ 120	2/ 4 1/4 @ 2/ 4 1/2	57.01 @ 58.28			
Scrap, loose	185	97	127	111	Crêpe, good pale	114 @ 116	2/ 3 1/4 @ 2/ 3 7/8	55.75 @ 56.50			

* Picul = 133½ pounds.

† Quoted in S. S. dollars (\$1.00 = 56.7 cents).

To obtain price per pound, United States currency, multiply price per picul by $42\frac{1}{2}$ and point off four figures to the left.

Compiled by the Singapore Chamber of Commerce Rubber Association.

GUTHRIE & CO., LIMITED, Singapore, report [September 14, 1916]:
The following was the course of values:

The following was the course of values

	In Singapore per picul.*	Sterling equivalent per pound in London.	Equivalent per pound in cents.†
Sheet, fine ribbed smoked....	116@120	2/ 3¼ @2/ 4¾	56.50@58.28
Sheet, good ribbed smoked....	111@115	2/ 2¾ @2/ 3½	54.22@56.00
Sheet, plain smoked.....	105@111	2/ 1½ @2/ 2¾	51.70@54.22
Sheet, ribbed unsmoked.....	107@108	2/ 2 @2/ 2½	52.70@52.95
Sheet, plain unsmoked.....	100@106	2/ 0½ @2/ 1¾	49.66@52.20
Crêpe, fine pale.....	117@120	2/ 4¼ @2/ 4¼	57.01@58.28
Crêpe, good pale.....	114@116	2/ 3¼ @2/ 3½	55.75@56.50
Crêpe, fine brown.....	112@114	2/ 3 @2/ 3½	54.73@55.75
Crêpe, good brown.....	106@111	2/ 1¾ @2/ 2¾	52.20@54.22
Crêpe, dark.....	90@107	1/ 10½ @2 2	45.35@52.70
Crêpe, bark.....	57@ 92	1/ 3½ @1/ 10½	31.42@46.12
Scrap, virgin.....	75@ 81	1/ 7½ @1/ 8½	39.02@41.56
Scrap, loose.....	50@ 84	1/ 2 @1/ 9½	28.38@42.82

COMPARATIVE NEW YORK PRICES FOR OCTOBER.

In regard to the financial situation, Albert B. Beers (broker in crude rubber and commercial paper, No. 68 William street, New York) advises as follows:

"There has been but little change this month in the general market for Commercial Paper, although not so many city banks are buying as recently, but the best rubber names have gone freely at 4@4½ per cent., and those not so well known 5@5½ per cent.

	1916.*	1915.	1914.
Upriver, fine	\$0.71 a 0.80	\$0.75 a 0.57	\$0.64 a 0.66
Upriver, coarse . . . . .	.42@ .46	.42@ .45	.43@ .47
Islands, fine . . . . .	.60@ .71	.50@ .54	.49@ .53
Islands, coarse . . . . .	.29@ .33	.26@ .28	.26@ .28
Cameta . . . . .	.31@ .35	.28@ .29	.29@ .32

*Figured only in October.

ANNUAL RUBBER PRODUCTION AND COMPARATIVE PRICES.

Year.	Fine Para.		First Latex.	
	Production, Tons.	Comparative Prices.	Production, Tons.	Comparative Prices.
1900	26,727	\$0.83@1.11½	4	.....
1901	30,296	.76@.95	5	.....
1902	28,668	.66@.92	8	.....
1903	31,079	.78@1.13	21	.....
1904	29,984	.89@1.32	43	.....
1905	33,913	1.13@1.35	145	.....
1906	35,251	1.16@1.28	510	\$0.86@1.50
1907	37,321	.69@1.24	1,000	.93@1.38
1908	38,848	.65@1.30	1,800	.75@1.05
1909	39,287	1.13@2.15	3,600	1.29@2.20
1910	37,954	1.16@2.90	8,200	1.40@2.25
1911	35,936	.90@1.67	14,419	1.14@1.68
1912	43,467	.93@1.22	28,518	1.03@1.38
1913	39,223	.59@1.10	47,618	.53@1.11
1914	37,215	.49@1.15	71,380	.55@1.80
1915	37,220	.75@.91	107,867	.59@1.00
*1916	37,000		150,000	

* Estimated.

PLANTATION RUBBER FROM THE FAR EAST.

TOTAL EXPORTS FROM MALAYA.

(From January 1, 1916, to dates named. Reported by Barlow & Co., Singapore. These figures include the production of the Federated Malay States, but not of Ceylon.)

	From Singapore. July 31, 1916.	From Malacca. July 31, 1916.	From Penang. July 31, 1916.	From Port Swet- tenham. September 11, 1916.	Totals.
United Kingdom.	17,765,687	3,967,630	13,174,434	20,679,766	55,587,517
The Continent	7,256,905	.....	51,200	.....	7,308,014
Japan	572,014	.....	.....	.....	2,572,014
Ceylon	267,963	.....	362,933	1,178,941	809,837
United States	47,692,888	.....	6,011,333	.....	53,704,221
Australia	184,314	.....	.....	.....	184,314
Totals	75,739,771	3,967,630	19,599,900	21,858,707	120,166,008
For same period, 1915	40,042,540	5,346,805	15,031,996	21,276,328	71,697,669
For same period, 1914	24,175,230	3,234,581	11,521,466	20,637,311	59,568,588
For same period, 1913	13,938,262	.....	8,222,533	19,946,488	42,107,283

FEDERATED MALAY STATES RUBBER EXPORTS.

An official cablegram from Kuala Lumpur gives the latest figures for the export of plantation rubber from the Federated Malay States during the month of September at 6,376 tons, against 5,782 tons in August last, and 3,984 tons in the corresponding month last year. This gives a total of 44,302 tons for nine months of the current year, against 30,657 tons in 1915 and 21,550 tons in 1914. This constitutes a record export from the Federated Malay States, eclipsing the previous month's export (which was also a record) by 594 tons. The following are the comparative figures:

	1914	1915	1916.
January	2,542	3,473	4,471
February	2,364	3,411	5,207
March	2,418	3,418	4,429
April	2,151	2,777	3,914
May	2,069	2,708	3,956
June	2,306	3,403	5,114
July	2,971	3,687	5,053
August	1,850	3,796	5,782
September	2,879	3,984	6,376
Totals	21,550	30,657	44,302

STRAITS SETTLEMENTS RUBBER EXPORTS.

An official cablegram from Singapore gives the figures of the export of plantation rubber from Straits Settlements ports during the month of August as 3,246 tons against 5,106 tons in July and 2,295 tons in the corresponding month last year. This gives a total of 31,964 tons for eight months of the current year against 20,228 tons in 1915 and 11,415 tons in 1914. Appended are the comparative statistics:

	1914.	1915.	1916.
January	1,181	2,576	4,443
February	1,703	2,741	3,359
March	1,285	2,477	4,481
April	1,548	1,978	4,219
May	1,309	3,588	3,274
June	1,480	2,249	3,836
July	1,584	2,324	5,106
August	1,325	2,295	3,246
Totals	11,415	20,228	31,964

These figures include transshipments of rubber from various places in the neighborhood of the Straits Settlements such as Borneo, Java, Sumatra and the non-Federated Malay States as well as rubber actually exported from the Colony, but *do not* include rubber exports from the Federated Malay States.

EXPORTS OF CEYLON GROWN RUBBER.

(From January 1 to September 11, 1915 and 1916. Compiled by the Ceylon Chamber of Commerce.)

To—	1915.	1916.
United States	10,623,497	17,450,389
Canada and Newfoundland.....	384,940	6,720
France	301,472	1,073,754
Russia	332,200	248,874
Italy		15,600
United Kingdom	16,837,653	14,690,012
Australia	518,937	697,551
India	1,000	728
Straits Settlements	119,933	43,680
Japan	236,251	218,189
Totals	29,355,883	34,445,577

(Same period 1914, 22,948,053 pounds; same period 1913, 16,477,894.) The export figures of rubber, given in the above table for 1914, include the imports re-exported. (These amount to 2,174,979 pounds from the Straits Settlements and 525,213 pounds from India.) To arrive at the total quantity of Ceylon rubber exported for that year deduct these imports from the total exports. The figures for 1915 and 1916 are for Ceylon rubber only.

IMPORTS AND EXPORTS OF RAW RUBBER AT CEYLON.

IMPORTS.		Pounds.
FROM AUGUST 1-28, 1916.		
From—	Pounds.	
Malay Peninsula—		Total
Port Swettenham	144,073	2,037,319
Penang	60,868	
Port Dickson	23,585	Europe:
Singapore	19,138	United Kingdom—
		England—
Total	247,664	London
		Liverpool
India		France (Marseilles)
Tutcorin	49,628	Italy (Genoa)
Cochin	27,692	
Alleppy	1,900	Total
		2,834,214
Total	79,220	
Burma		Asia
Rangoon	1,097	Japan
		Kobe
Grand total	327,981	Yokohama
		Singapore
		43,680
EXPORTS.		
FROM AUGUST 1-31, 1916.		
To—		Total
North America:		67,480
United States—		Oceania:
New York	1,960,518	Australia
		91,980
		Grand total
		5,030,993

RUBBER AND GUTTA EXPORTS FROM JAVA AND MADURA.

		June		Six Months Ending June	
		1915.	1916.	1915.	1916.
PLANTATIONS, 10-					
Holland.....	Ficus .....pounds	330	.....	22,359	.....
	Hevea	250,800	.....	1,084,600	211,000
	Hevea (to order)	.....	.....	4	.....
	Manihot (Ceara)	.....	.....	11,048	.....
	Castilloa	1,760	.....	2,288	.....
	Totals	252,890	.....	1,373,189	211,000
Great Britain.....	Ficus	499	10,305	12,705	18,775
	Hevea	371,800	950,400	2,246,200	3,339,600
	Manihot (Ceara)	1,998	31,264	9,788	48,792
	Castilloa	9,088	9,775	56,190	28,607
	Totals	383,385	1,001,744	2,324,883	3,435,774
Singapore.....	Ficus	6,037	3,520	9,299	24,240
	Hevea	77,000	301,400	294,800	2,041,600
	Manihot (Ceara)	.....	2,090	.....	20,106
	Castilloa	.....	880	.....	3,245
	Totals	83,037	307,890	304,099	2,089,191
United States.	Ficus	.....	.....	.....	32,087
	Hevea	572,000	932,800	3,161,400	7,411,800
	Manihot (Ceara)	.....	.....	.....	11,114
	Totals	572,000	932,800	3,161,400	7,455,001
Other countries..	Ficus	433	.....	433	2,792
	Hevea	15,400	61,600	279,400	268,400
	Totals	15,833	61,600	279,833	271,192
	Grand Totals	1,307,145	2,304,034	7,443,403	13,251,369
GUTTA PERCHA, 10-					
Singapore.....		13,486	39,290	313,214	265,767
GUTTA FLEUDED, 10-					
United States.....		.....	295	.....	295
Singapore.....		.....	.....	1,584	14,373
	Totals	.....	295	1,584	14,668

EXPORTS OF INDIA RUBBER FROM MANAOS DURING AUGUST, 1916.

EXPORTERS.	NEW YORK.					EUROPE.					Grand Totals.
	Fine.	Medium.	Coarse.	Caucho.	Totals.	Fine.	Medium.	Coarse.	Caucho.	Totals.	
Suter & Co.	7,186	9,554	14,588	98	96,396	71,740				152,380	248,776
General Rubber Co.	184,688	22,951	33,968	14,034	255,531	165,178	12,730	4,562	145,830	328,300	583,831
Tancredo Porto & Co.	100,453	11,449	20,442	344	132,688	22,822	6,637	150	17,510	47,119	179,807
J. G. Araujo	35,614		5,775	150	41,539	12,066	671	4,178	1,913	18,828	60,367
Ohliver & Co.	9,071	2,104	4,862	5,787	11,844						41,824
Armazens Andresen	10,158	373	2,588	1,301	14,420						14,420
Sutcliffe & Co.	1,172	681	1,004	2,638	6,500						6,500
Wolbert H. Allen, Ltd.	1,700		600	340	2,640	17			12,008	12,178	14,818
Th. Levy, Camille & Co.							535	450	300	1,285	1,285
Mesquita & Co.						305	31	787	92	1,215	1,215
Semper & Co.			935	62	997						997
Totals, August, 1916	437,992	47,117	84,672	24,754	592,535	272,281	20,604	10,127	258,293	561,305	1,153,840
July, 1916	88,014	21,593	31,284	204,740	495,631	68,650	18,914	269,029	400,525	896,150	
June, 1916	163,154	22,947	88,415	102,665	377,181	50,958	60,676	9,035	228,956	349,625	726,806
May, 1916	430,544	69,135	142,723	280,793	923,195	28,635	29,243	17,539	198,313	273,730	1,196,925
April, 1916	334,337	48,556	168,393	377,014	928,300	212,682	50,555	35,419	252,036	550,692	1,478,992
March, 1916	502,323	76,236	228,580	320,482	1,127,621	450,320	87,029	49,033	318,648	905,030	2,032,651
February, 1916	546,003	82,739	191,537	205,419	1,025,698	164,400	27,819	56,344	119,229	367,792	1,393,490
January, 1916	561,143	110,411	176,779	148,142	996,475	543,822	58,574	75,105	123,703	801,204	1,797,679

(Compiled by Suter & Co., Manao.)

CRUDE RUBBER ARRIVALS AT THE PORT OF NEW YORK.

[The Figures Indicate Weights in Pounds.]

SEPT. 21.—By the steamer *Tapajoz* from Pará and Manao:

	Fine	Medium.	Coarse.	Caucho.	Total.
Meyer & Brown	157,406	14,400	39,300	1,800	212,900
Davies, Turner & Co.	85,000	6,800	29,500	20,300	341,600
Henderson & Korn	21,300	18,200	79,400	1,700	120,600
H. A. Astlett & Co.	60,800	20,600	14,800	400	96,600
Paul Bertuch	58,200		14,000	2,800	75,000
Arnold & Zeiss	45,500	5,700	18,200	200	69,600
General Rubber Co.	19,500	2,000	35,700		57,200
G. Amsinck & Co.	44,700		2,600	8,500	55,800
Muller, Schall & Co.	31,500	1,100	3,500	1,000	37,100
F. D. Duerr & Co.	13,000			6,100	19,100
Aldens' Successors, Ltd.		3,600	1,200	700	5,500
Totals	736,900	72,400	238,200	43,500	1,091,000

SEPT. 26.—By the steamer *Minas Geraes* from Pará and Manao:

	Fine	Medium.	Coarse.	Caucho.	Total.
Meyer & Brown	9,500	1,800	37,900		69,200
Paul Bertuch	40,300	24,800	14,900	1,000	81,000
E. T. Greiner	14,100	24,600	9,400	11,500	59,600
Davies, Turner & Co.	49,500		6,300	1,700	57,500
General Rubber Co.		5,300	41,800		47,100
H. A. Astlett & Co.	22,200		21,200		43,400
Arnold & Zeiss	3,200		27,100		30,300
Henderson & Korn		3,900	18,000	7,300	29,200
Hagemeyer & Brunn	7,300	700	1,300	4,600	13,900

Aldens' Successors, Ltd.	800	3,800	3,800	8,400
Muller, Schall & Co.	4,000		2,400	1,300
Totals	170,900	64,900	184,100	27,400

SEPT. 29.—By the steamer *Francis* from Pará and Manao:

Meyer & Brown			14,500	14,500
Davies, Turner & Co.	53,600		11,500	32,800
H. A. Astlett & Co.	22,500	27,100	12,100	61,700
Arnold & Zeiss	12,900	2,000	2,600	17,500
F. D. Duerr & Co.	12,500			2,500
Henderson & Korn		1,800	11,200	13,000
Paul Bertuch	11,800		1,200	13,000
Totals	113,300	30,900	53,100	35,300

OCT. 14.—By the steamer *Sao Paulo* from Pará and Manao:

Meyer & Brown	93,600	8,200	70,900	13,100	185,800
Davies, Turner & Co.	33,000	8,500	3,600	2,300	353,400
Arnold & Zeiss	87,100	14,900	37,000	600	139,600
Hagemeyer & Brunn	58,300	9,100	10,900	11,600	89,900
H. A. Astlett & Co.	57,000	14,400	11,800	3,000	86,200
Paul Bertuch	50,900	11,300	15,300		77,500
Muller, Schall & Co.	25,400	2,900	9,000	13,500	50,800
Aldens' Successors, Ltd.	6,700	23,000	22,000	400	52,100
Robinson & Co.	18,200	5,800	4,200		28,200
Henderson & Korn			4,100		4,100
General Rubber Co.		1,300	600		1,900
Totals	789,300	99,400	189,400	44,500	1,069,400

PARAS.	POUNDS.
SEPTEMBER 27.—By the <i>Advance</i> =Colon:	
G. Amsinck & Co. (Fine)	18,000
G. Amsinck & Co. (Coarse)	7,000
Neuss, Hesslein & Co. (Fine)	6,000
Totals	31,000

CENTRALS.	POUNDS.
[*This sign, in connection with imports of Centrals, denotes Guayule rubber.]	
SEPTEMBER 22.—By the <i>Santa Marta</i> =Cartagena:	
G. Amsinck & Co.	8,000
Mecke & Co.	2,000
Cowdrey & Co.	1,500
Totals	11,500

SEPTEMBER 26.—By the <i>Metapan</i> =Port Limon:	
A. Held	1,500
Isaac Brandon & Bros.	1,000
Totals	2,500

SEPTEMBER 27.—By the <i>Advance</i> =Colon:	
G. Amsinck & Co.	10,500
Fidanque Bros. & Co.	1,500
Totals	12,000

SEPTEMBER 28.—By the <i>Almirante</i> =Cartagena:	
A. Held	1,000
Totals	1,000

OCTOBER 2.—By the <i>Tivies</i> =Barrios:	
A. Rosenthal & Sons	4,000
Various	500
Totals	4,500

OCTOBER 2.—By the <i>Montez</i> =Mexico:	
Steiger Trading Co.	8,000
Graham-Hinkley Co.	2,000
Harburger & Stack	1,500
J. A. Medina & Co.	1,000
Totals	12,500

OCTOBER 2.—By the <i>Montez</i> =Tampico:	
C. Tennant, Sons & Co.	*60,000
Totals	*60,000

OCTOBER 3.—By the <i>Pastores</i> =Port Limon:	
Isaac Brandon & Bros.	1,500
A. A. Linde & Co.	2,000
C. F. Hernandez & Co.	500
Totals	4,000

	POUNDS.
OCTOBER 3.—By the <i>Yummi</i> =Mexico:	
American Trading Co.....	26,000

OCTOBER 7.—By the <i>Norma</i> =Cartagena:	
Andean Trading Co.	3,000
Pablo Calvet & Co.	500
Totals	3,500

OCTOBER 9.—By the <i>Zacapa</i> =Colombia:	
Muller, Schall & Co.	1,000
G. Amsinck & Co.	500
Totals	1,500

OCTOBER 11.—By the <i>Allianza</i> =Colon:	
G. Amsinck & Co.	3,500
F. S. Sembrado & Co.	2,600
Pablo Calvet & Co.	8,400
A. M. Capen's Sons	2,100
Ameri in Trading Co.	1,800
Camacho, Roldan & Van Sichel	1,200
Totals	19,600

OCTOBER 13.—By the <i>Ancon</i> =Colon:	
W. R. Grace & Co.	2,000
Totals	2,000

OCTOBER 13.—By the <i>Mercury</i> =New Orleans:	
Various	60,000
Totals	60,000

OCTOBER 16.—By the <i>Esperanza</i> =Tampico:	
C. Tennant, Sons & Co.	*70,000
Totals	*70,000

OCTOBER 16.—By the <i>Esperanza</i> =Mexico:	
G. Schaumann & Co.	7,000
H. Marquardt & Co.	2,500
General Export & Commission Co.	500
Totals	10,000

OCTOBER 17.—By the <i>Colon</i> =Colon:	
Mecke & Co.	3,100
Piza Nephews & Co.	4,000
Knauth, Nachod & Kuhne	1,500
Isaac Brandon & Bros.	1,500
Fidanque Bros. & Co.	1,000
Totals	11,100

	POUNDS.
OCTOBER 17. By the <i>Port Limon</i> :	
Fruit Despatch Co.	4,000

OCTOBER 17.—By the <i>Carrillo</i> =Cortez:	
A. Rosenthal & Sons	2,000
Eggers & Heinlein	1,500
F. S. Sembrado & Co.	1,000
Totals	4,500

AFRICANS.	
SEPTEMBER 23.—By the <i>Celtic</i> =Liverpool:	
Fred. Stern & Co.	2,500
Totals	2,500

SEPTEMBER 25.—By the <i>Strathspey</i> =Havre:	
Robert Badenhop & Co., Inc.	10,000
Totals	10,000

SEPTEMBER 25.—By the <i>Saxonia</i> =Liverpool:	
Arnold & Zeiss	22,500
Robinson & Co.	2,500
Totals	25,000

SEPTEMBER 29.—By the <i>Baltic</i> =Liverpool:	
Fred. Stern & Co.	7,000
Totals	7,000

SEPTEMBER 30.—By the <i>Port Limon</i> =Batavia:	
General Rubber Co.	385,000
Karl Schroeder	20,000
Various	55,000
Totals	460,000

OCTOBER 2.—By the <i>Monadnock</i> =Bordeaux:	
Various	22,000
Totals	22,000

OCTOBER 5.—By the <i>Adriatic</i> =Liverpool:	
Various	11,000
Totals	11,000

OCTOBER 13.—By the <i>Marengo</i> =Hull:	
Aldens' Successors, Ltd.	34,000
Totals	34,000

OCTOBER 17.—By the <i>Orduna</i> =Liverpool:	
Arnold & Zeiss	98,000
Hagemeyer Trading Co.	33,500
Totals	131,500

OCTOBER 17.—By the <i>Strathlorne</i> =Havre:	
Robert Badenhop Co., Inc.	22,500
Totals	22,500

OCTOBER 17.—By the <i>Meuse</i> =Bordeaux:	
Robert Badenhop Co., Inc.	22,500
Totals	22,500

OCTOBER 18.—By the *Idaho*=Hull:
Robert Badenhop Co., Inc. 11,000

MANICOBAS.

SEPTEMBER 25.—By the *Teren*=Bahia:
Adolph Hirsch & Co. 40,000

SEPTEMBER 25.—By the *Atahualpa*=Parnahyba:
G. Amsinck & Co. 16,000
Rossbach Bros. & Co. 30,000
Various 12,000 58,000

SEPTEMBER 26.—By the *Minas Geraes*=Bahia:
Lawrence Johnson & Co. 25,000
Adolph Hirsch & Co. 5,000
Various 12,000 42,000

SEPTEMBER 29.—By the *Francis*=Pernambuco:
Rossbach Bros. & Co. 38,000

SEPTEMBER 29.—By the *Francis*=Natal:
Various 12,500

SEPTEMBER 29.—By the *Francis*=Ceara:
Various 75,000

OCTOBER 14.—By the *Sao Paulo*=Pernambuco:
Lawrence Johnson & Co. 5,000

OCTOBER 17.—By the *Orduna*=Liverpool:
Arnold & Zeiss 160,000

PLANTATIONS.

SEPTEMBER 22.—By the *Manaster Castle*=Singapore:
Meyer & Brown 40,000

Edward Maurer & Co., Inc. 45,000
Charles T. Wilson Co., Inc. 13,500
Robinson & Co. 72,000
H. R. Jeffers 11,200
Henderson & Korn 470,000
Arnold & Zeiss 18,000
J. T. Johnstone & Co. 530,000
Fox & Co. 100,000
W. R. Grace & Co. 4,500
Goodyear Tire & Rubber Co. 130,000
L. Littlejohn & Co. 428,960 1,862,100

SEPTEMBER 22.—By the *Suvero*=Colombo:
Meyer & Brown 80,000
L. Littlejohn & Co. 84,560
Goodyear Tire & Rubber Co. 33,500
W. H. Stiles & Co. 45,000
Arnold & Zeiss 103,000
Robinson & Co. 7,000
J. T. Johnstone & Co. 5,000
Henderson & Korn 27,000 385,060

SEPTEMBER 23.—By the *Idaho*=London:
Arnold & Zeiss 115,000
J. T. Johnstone & Co. 40,000
Raw Products Co. 11,200
Robinson & Co. 9,000 175,200

SEPTEMBER 23.—By the *Empire Transport*=Colombo:
Meyer & Brown 85,000
L. Littlejohn & Co. 74,920
W. H. Stiles & Co. 11,200
Edward Maurer & Co., Inc. 16,000
W. R. Grace & Co. 11,200
J. T. Johnstone & Co. 20,000
Arnold & Zeiss 100,000 318,320

SEPTEMBER 25.—By the *Merton Hall*=Colombo:
Meyer & Brown 280,000
L. Littlejohn & Co. 42,560
Arnold & Zeiss 25,000
W. H. Stiles & Co. 25,000
Edward Maurer & Co., Inc. 2,200 374,760

SEPTEMBER 27.—By the *St. Bel*=Singapore:
Meyer & Brown 150,000
General Rubber Co. 185,000
Edward Maurer & Co., Inc. 150,000
J. T. Johnstone & Co. 185,000
E. J. Curry 100,000
Arnold & Zeiss 70,000
Fred. Stern & Co. 60,000
Fox & Co. 45,000
H. R. Jeffers 11,200
Rubber Trading Co. 18,000
Aldens' Successors, Ltd. 30,000
Charles T. Wilson Co., Inc. 120,000
Robinson & Co. 175,000
L. Littlejohn & Co. 781,760
Henderson & Korn 510,000
Robert Badenhop & Co., Inc. 11,200
Goodyear Tire & Rubber Co. 90,000 2,692,160

SEPTEMBER 29.—By the *Idaho*=Bahia:
Meyer & Brown 100,000
General Rubber Co. 35,000
Fox & Co. 80,000
Rubber Trading Co. 2,000
G. Amsinck & Co. 430,000
Henderson & Korn 250,000
Charles T. Wilson Co., Inc. 27,000
G. Wechmar & Co. 70,000
J. T. Johnstone & Co. 100,000
Manhattan Rubber Manufacturing Co. 120,000

POUNDS.
W. R. Grace & Co. 50,000
Edward Maurer & Co., Inc. 350,000
Goodyear Tire & Rubber Co. 160,000
Aldens' Successors, Ltd. 20,000
Joosten & Jansen 85,000
Stein, Hirsch & Co. 75,000
L. Littlejohn & Co. 127,860
Arnold & Zeiss 9,000
Various 200,000 2,290,860

SEPTEMBER 30.—By the *Manchuria*=London:
Meyer & Brown 70,000
Goodyear Tire & Rubber Co. 115,000
Charles T. Wilson Co., Inc. 50,000
Raw Products Co. 22,500
Rubber Trading Co. 8,000 265,500

OCTOBER 2.—By the *Alaunia*=London:
J. T. Johnstone & Co. 95,000
Robinson & Co. 40,000
Hagemeyer Trading Co. 25,000 160,000

OCTOBER 3.—By the *Kazembe*=Colombo:
Meyer & Brown 90,000
L. Littlejohn & Co. 421,120
W. R. Grace & Co. 4,500
Henderson & Korn 59,000
Arnold & Zeiss 135,000
Charles T. Wilson Co., Inc. 16,000
Aldens' Successors, Ltd. 11,500
J. T. Johnstone & Co. 16,000
Goodyear Tire & Rubber Co. 60,000
Robinson & Co. 30,000
Edward Maurer & Co., Inc. 45,000
W. H. Stiles & Co. 185,000
Various 20,000 1,087,120

OCTOBER 3.—By the *Minnesota*=London:
Fred Stern & Co. 22,500

OCTOBER 5.—By the *Pannonia*=London:
Meyer & Brown 80,000
Arnold & Zeiss 235,000
General Rubber Co. 195,000
Michelin Tire Co. 90,000 600,000

OCTOBER 5.—By the *Minnehaha*=London:
Meyer & Brown 100,000
Edward Maurer & Co., Inc. 30,000
General Rubber Co. 100,000
Fred Stern & Co. 16,000
Rubber Trading Co. 22,500
Charles T. Wilson Co., Inc. 9,000
G. R. Henke 9,000 286,500

OCTOBER 7.—By the *Philadelphia*=London:
Fred Stern & Co. 13,500

OCTOBER 9.—By the *City of Corinth*=Colombo:
Meyer & Brown 350,000
L. Littlejohn & Co. 112,000
Arnold & Zeiss 135,000
W. H. Stiles & Co. 70,000
J. T. Johnstone & Co. 33,500
Robinson & Co. 9,000
Edward Maurer & Co., Inc. 2,200
Various 5,000 716,700

OCTOBER 9.—By the *Castlemore*=Colombo:
Meyer & Brown 275,000
L. Littlejohn & Co. 56,000
Goodyear Tire & Rubber Co. 33,500
J. T. Johnstone & Co. 22,500 387,000

OCTOBER 13.—By the *Imperial*=London:
Rubber Trading Co. 30,000
Charles T. Wilson Co., Inc. 25,000 55,000

OCTOBER 17.—By the *City of Naples*=Singapore:
Meyer & Brown 11,000
Edward Maurer & Co., Inc. 36,000
General Rubber Co. 90,000
Fox & Co. 11,000
Goodyear Tire & Rubber Co. 40,000
Charles T. Wilson Co., Inc. 50,000
H. R. Jeffers 5,000
Robinson & Co. 60,000
Henderson & Korn 205,000
Raw Products Co. 11,000
L. Littlejohn & Co. 151,200
Arnold & Zeiss 32,000
J. T. Johnstone & Co. 160,000 862,200

CRUDE RUBBER ARRIVALS AT SEATTLE.

Consigned to seven first-class rubber plantations.
Exported 130 pounds net to 100,000.

PLANTATION. POUNDS.
TO SEATTLE.

OCTOBER 2.—By the steamer *Yokohama Maru*.
Firestone Tire & Rubber Co. 31,954
The Waterhouse Co. 31,954
W. R. Grace & Co. 8,320 140,270

TO SAN FRANCISCO.
OCTOBER 2.—By the steamer *Shinto Maru*.
Goodyear Tire & Rubber Co. 3,380
Planters Stores & Agency Co. 3,380

POUNDS.
TO SEATTLE.
The B. F. Goodrich Co.
W. T. Easley 465,530
Firestone Tire & Rubber Co. 240,890
The Waterhouse Co. 16,120 722,540

TO AKRON.
OCTOBER 7.—By the steamer *Tanaka Maru*.
The B. F. Goodrich Co. 118,950
W. T. Easley 98,280
Firestone Tire & Rubber Co. 57,220 274,450

TO SEATTLE.
OCTOBER 10.—By the steamer *Kaifunezan Maru*.
The B. F. Goodrich Co. 737,360
W. T. Easley 16,380
Henderson & Korn 36,660
East Asiatic Co. 6,370 796,770

TO AKRON.
OCTOBER 13.—By the steamer *Manila Maru*.
The B. F. Goodrich Co. 254,410
W. T. Easley 254,410

TO AKRON.
OCTOBER 17.—By the steamer *Protesilaus*.
Firestone Tire & Rubber Co. 398,710
The Waterhouse Co. 185,120
Goodyear Tire & Rubber Co. 156,390
Wadleigh & Co. 110,890
Duff Development Co. 33,540
Harrisons & Crosfield 28,860 913,510

TO NEW YORK.
Arnold & Zeiss 9,100
Planters Stores & Agency Co. 6,370
East Asiatic Co. 4,290
Kuolanar Planters Rubber Co. 5,460 25,220

TO SEATTLE.
W. R. Grace & Co. 13,650
Whitehall & Co. 10,920
Carson & Co. 5,070
Glensheil Rubber Estate 3,250
R. T. Reid & Co. 2,860
Mansfield & Co. 2,470
Cheras Rubber Estate 2,470
Sungei Burun Rubber Estate 4,550
Arnold & Zeiss 1,950 47,190

GUTTA JELUTONG.
TO SAN FRANCISCO.

OCTOBER 2.—By the steamer *Shinto Maru*.
Bowers Rubber Works. 3,380
Katz Bros. 14,950

TO SEATTLE.
L. Littlejohn & Co. 14,950
Katz Bros. 14,950

CUSTOM HOUSE STATISTICS.

PORT OF DETROIT—AUGUST, 1916.
IMPORTS: POUNDS. VALUE.
Rubber, scrap 43,337 \$1,112
EXPORTS:
Rubber scrap 2,428 \$173
India rubber boots, pairs 3,128 7,333
India rubber shoes, pairs 72 119
Automobile tires 2,876
Other rubber tires 79
Belting, hose, etc. 3,448
All other manufactures of india rubber 3,857
Total \$17,785

PORT OF DETROIT—SEPTEMBER, 1916.
IMPORTS: POUNDS. VALUE.
Rubber, scrap 30,000 \$17
EXPORTS:
Rubber scrap 95,050 \$9,779
India rubber boots, pairs 2,849 6,534
India rubber shoes, pairs 4
Automobile tires 4,816
Other rubber tires
Belting, hose, etc.
All other manufactures of india rubber 4,597
Total \$26,491

PORT OF NEW ORLEANS—AUGUST, 1916.			IMPORTS:			EXPORTS:			IMPORTS:			EXPORTS:		
IMPORTS:	POUNDS.	VALUE.	IMPORTS:	POUNDS.	VALUE.	EXPORTS:	POUNDS.	VALUE.	IMPORTS:	POUNDS.	VALUE.	EXPORTS:	POUNDS.	VALUE.
India rubber	17,352	\$6,362	Balata	429,478	106,258	India rubber	3,347	\$1,700	Gutta jelutong (Pontianak) ..	170,000	6,771	Rubber scrap	2,946	\$884
EXPORTS:			Gutta percha	41,528	11,205	Balata	135,307	67,254	Rubber scrap	50,207	3,321	India rubber boots....pairs	38,884	76,222
India rubber boots....pairs		\$22	Gutta jelutong (Pontianak) ..	845,056	43,133	Rubber scrap	52,731	9,430	Manufactures of india rubber		1,446	India rubber shoes....pairs	105,643	45,858
India rubber shoes....pairs		206	Manufactures of india rubber		33,569	Reclaimed rubber	40,857	7,026				Automobile tires		791
Automobile tires		1,596	Totals	14,249,537	\$6,923,584	India rubber boots....pairs	656	1,690				Other rubber tires		35
Belting, hose, etc.		517				India rubber shoes....pairs	226,889	116,534				Belting, hose, etc.		6,059
All other manufactures of india rubber		1,520				Automobile tires		405,483				All other manufactures of india rubber		44,044
Total		\$3,851				Other rubber tires		113,833				Total		\$173,893
PORT OF NEW ORLEANS—SEPTEMBER, 1916.						Belting, hose, etc.		176,433						
IMPORTS:						All other manufactures of india rubber		418,727						
India rubber	24,848	\$10,560				Total		\$1,318,110						
PORT OF NEW YORK—AUGUST, 1916.						PORT OF SAN FRANCISCO—AUGUST, 1916.								
IMPORTS:						IMPORTS:								
India rubber	15,599,321	\$8,751,981				India rubber	558,730	\$306,780						
Balata	204,256	103,164				Rubber scrap	500	80						
Gutta percha	632,079	72,243				Manufactures of india rubber		2,394						
Gutta jelutong (Pontianak) ..	4,254,623	171,830				Totals	559,230	\$309,254						
Manufactures of india rubber		26,388				EXPORTS:								
Totals	20,690,279	\$9,125,606				India rubber boots....pairs	145	\$881						
EXPORTS:						India rubber shoes....pairs	6,052	5,105						
India rubber	22,463	\$9,357				Automobile tires		197,097						
Balata	129,883	58,985				Other rubber tires		21,944						
Rubber scrap	62,266	10,632				Belting, hose, etc.		57,074						
Reclaimed rubber	34,859	6,694				All other manufactures of india rubber		37,549						
India rubber boots....pairs	2,508	5,682				Total		\$319,650						
India rubber shoes....pairs	213,404	84,671				PORT OF BOSTON—SEPTEMBER, 1916.								
Automobile tires		500,945				IMPORTS:								
Other rubber tires		241,976				India rubber	45,761	\$18,701						
Belting, hose, etc.		295,632												
All other manufactures of india rubber		689,813												
Total		\$1,904,387												
PORT OF NEW YORK—SEPTEMBER, 1916.														
IMPORTS:														
India rubber	13,133,575	\$6,729,419												

RUBBER STATISTICS FOR THE UNITED STATES.

IMPORTS OF CRUDE AND MANUFACTURED RUBBER.

UNMANUFACTURED—free	July, 1916.		Seven Months Ending July, 1916.	
	Pounds.	Value.	Pounds.	Value.
India rubber:				
From France			352,811	\$236,921
Portugal			1,180,590	533,455
United Kingdom	3,453,428	\$2,077,631	38,811,201	28,985,572
Central America and British Honduras..	85,984	40,326	846,528	397,544
Mexico	75,530	37,669	2,073,772	851,452
Brazil	2,435,800	957,071	33,218,578	16,840,235
Other South America	386,187	180,836	3,516,478	1,746,741
East Indies	8,248,562	5,332,647	85,834,686	54,860,806
Other countries	46,898	39,234	518,883	399,917
Totals	14,734,388	\$8,665,414	166,053,527	\$104,852,643
Balata	148,639	62,109	1,399,637	561,741
Guayule gum	61,644	18,495	1,398,480	404,955
*Gutta jelutong			14,724,397	759,205
†Gutta jelutong	1,392,109	78,693	1,392,109	78,693
Gutta percha	210,558	23,488	2,142,566	227,756
Totals	16,547,338	\$8,848,199	187,110,716	\$106,884,994
Rubber scrap	811,431	60,834	9,283,782	752,284
Totals, unmanufactured..	17,358,769	\$8,909,033	196,394,498	\$107,637,278
Chicle	574,661	\$258,658	4,338,102	\$1,832,244
MANUFACTURED—(dutiable):				
Gutta percha		\$43,569		\$96,671
India rubber		29,169		273,674
Totals, manufactured.....		\$72,738		\$370,345
Substitutes—elasticon, etc....		\$3,990		\$11,082

EXPORTS OF DOMESTIC MERCHANDISE.

MANUFACTURED	July, 1916.		Seven Months Ending July, 1916.	
	Pounds.	Value.	Pounds.	Value.
Automobile tires:				
†To Russia in Europe.....		\$234		\$868,529
England		237,544		4,573,580
Canada		91,791		600,485
Mexico		10,716		152,373
Cuba		86,907		401,253
Australia		119,952		1,294,009
New Zealand		145,445		779,240
Philippine Islands		30,228		279,877
Other countries		198,699		1,898,644
Totals		\$921,786		\$10,847,990
All other tires		347,283		1,740,691
Belting, hose and packing....		268,494		2,082,460
Rubber boots	24,886	51,173	305,244	689,592
Rubber shoes	373,664	151,835	1,304,834	648,002
Scrap and old rubber	198,087	23,274	2,313,001	245,722

*Free, January to June, 1916, (inclusive).

†Dutiable beginning July 1, 1916.

‡Not separately stated prior to January 1, 1916.

Reclaimed rubber	430,001	71,304	3,743,857	538,665
Other rubber manufactures...		737,292		5,093,256
Totals, manufactured		\$2,572,441		\$21,887,078
Fountain pens	14,041	\$9,658	147,531	\$82,919

EXPORTS OF FOREIGN MERCHANDISE.

UNMANUFACTURED	July, 1916.		Seven Months Ending July, 1916.	
	Pounds.	Value.	Pounds.	Value.
Balata	15,317	\$6,708	494,345	\$176,633
Guayule gum				
Gutta jelutong			56,000	2,520
Gutta percha			2,383	2,095
India rubber	988,192	671,571	3,789,321	2,396,592
Rubber scrap and refuse				
Totals, unmanufactured..	1,003,509	\$678,279	4,342,049	\$2,577,840
Chicle	14,809	\$4,874	77,566	\$26,958
MANUFACTURED				
Gutta percha				\$352
India rubber				31,614
Totals, manufactured				\$31,966

EXPORTS OF RUBBER GOODS TO NON-CONTIGUOUS TERRITORIES OF THE UNITED STATES.

MANUFACTURED—	July, 1916.		Seven Months Ending July, 1916.	
	Pounds.	Value.	Pounds.	Value.
To Alaska:				
Belting, hose and packing		\$8,630		\$70,731
Boots and shoes... (pairs)	7,003	23,188	44,783	123,652
Other rubber goods		2,880		25,337
Totals		\$34,698		\$219,720
To Hawaii:				
Belting, hose and packing.		\$4,609		\$48,500
Automobile tires		34,487		318,109
Other tires		2,993		59,771
Other rubber goods		7,272		53,958
Totals		\$49,361		\$480,338
To Philippine Islands:				
Belting, hose and packing.		\$419		\$39,378
Boots and shoes... (pairs)	13,502	7,772	24,936	15,763
Tires		34,257		286,766
Other rubber goods....		5,463		179,745
Totals		\$47,911		\$521,652
To Porto Rico:				
Belting, hose and packing.		3,428		\$22,416
Automobile tires		51,433		272,120
Other tires		915		18,967
Other rubber goods.....		10,500		52,440
Totals		\$66,276		\$365,943

IMPORTS AND EXPORTS OF CRUDE AND MANUFACTURED RUBBER AT THE PORT OF NEW YORK.

IMPORTS.

Week Ending—	India Rubber.		Scrap for Re manufacture.		Balata.		Gutta Percha.		Chicle.	
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
September 22, 1916.....	3,003,963	1,671,436	85,756	\$5,286	160,359	\$53,814	9,791	\$1,103†	.....	.....
September 29, 1916.....	5,704,085	2,933,808	64,456	4,162	62,842	26,699	2,411	197†	.....	.....
October 6, 1916.....	7,917,017	4,122,820	160,186	13,507	18,690	8,282	.....	361	46,439	\$28,674
October 13, 1916.....	2,346,559	1,278,037	219,787	6,588	154,439	102,360	.....	2†	.....	.....

EXPORTS.

FIGURES ISSUED FROM SEPTEMBER 25 TO OCTOBER 24, 1916.

EXPORTED TO —	Belting, Hose and Packing.	Footwear.		Tires.		Insulated Wire and Cables.	Other mnf. of India Rubber.	Fountain Pens.	Chewing Gum.	Reclaimed Rubber.	Scrap Rubber.
		Boots.	Shoes.	Auto.	Other.						
NORTH AMERICA:											
Bermuda	57	.....	\$4	.....	.....	.....	\$440	\$5	.....	.....	.....
British Honduras	57	.....	.....	.....	.....	\$16	81	.....	.....	.....	.....
Canada .....	.....	.....	.....	.....	.....	228	92	.....	.....	.....	.....
Central American States—											
Costa Rica	603	.....	.....	\$2,188	.....	.....	1,002	.....	\$542	.....	.....
Guatemala	188	.....	.....	454	320	.....	1,198	.....	887	.....	.....
Honduras	48	4	.....	1,040	.....	359	147	.....	60	.....	.....
Nicaragua	119	.....	.....	.....	.....	33	1,231	.....	.....	.....	.....
Panama	7,794	.....	930	2,077	1,537	12,672	3,520	31	1,551	.....	.....
Salvador	847	.....	.....	.....	340	132	1,992	.....	.....	.....	.....
Mexico	6,505	.....	.....	7,841	5,496	7,803	14,377	25	18	.....	.....
Newfoundland	428	.....	8,854	243	86	490	1,203	145	257	.....	.....
West Indies—											
British—											
Barbados	45	.....	.....	861	106	.....	667	.....	.....	.....	.....
Jamaica	774	.....	.....	10,827	.....	.....	643	.....	.....	.....	.....
Trinidad and Tobago	416	.....	1,259	2,289	477	101	2,762	.....	16	.....	.....
Other British	272	.....	.....	1,253	7	118	195	.....	16	.....	.....
Cuba	23,673	.....	1,110	36,981	16,069	27,717	37,373	540	1,706	.....	.....
Danish	6	.....	5	138	.....	.....	13	5	.....	.....	.....
Dutch	39	.....	.....	677	50	79	453	.....	.....	.....	.....
French .....	.....	.....	31	4,182	485	183	69	168	.....	.....	.....
Haiti	1	.....	.....	628	10	60	110	.....	.....	.....	.....
Santo Domingo	1,323	.....	.....	4,179	231	670	1,053	47	298	.....	.....
Totals, North America...	\$43,165	\$251	\$12,401	\$75,858	\$25,627	\$50,864	\$68,622	\$972	\$5,442	.....	.....
EUROPE:											
Azores Islands .....	.....	.....	\$36	.....	.....	.....	\$30	.....	.....	.....	.....
Denmark	3,113	.....	11,325	\$1,537	\$140	.....	1,237	.....	.....	.....	.....
Finland .....	.....	.....	.....	.....	.....	.....	1,440	.....	.....	.....	.....
France	3,755	\$318	10,316	.....	4,833	333,628	35,670	.....	\$13,447	\$15,587	\$6,480
Greece .....	.....	.....	.....	.....	.....	.....	.....	.....	1,124	.....	.....
Iceland .....	.....	.....	.....	.....	.....	.....	60	.....	.....	.....	.....
Italy .....	.....	.....	556	492	10,235	2,644	11,652	.....	.....	.....	10
Netherlands .....	.....	.....	584	10,292	1,022	2,100	5,382	\$1,469	.....	.....	.....
Norway	6,227	.....	170	80	.....	10,977	97	50	.....	.....	.....
Portugal .....	.....	.....	.....	75	.....	.....	65	.....	.....	.....	.....
Russia in Europe .....	.....	.....	.....	130	.....	9	11,282	.....	.....	.....	.....
Spain	68	.....	.....	13,222	.....	389	2,887	3,862	.....	.....	.....
Sweden	11,385	.....	.....	2,762	12	.....	1,227	.....	.....	.....	.....
Switzerland .....	.....	.....	.....	.....	.....	1,188	.....	.....	.....	.....	.....
United Kingdom—											
England	28,108	3,027	32,065	145,438	30,421	98,122	152,676	422	71,556	6,289	20,450
Scotland	19,872	.....	.....	144	15	.....	898	489	629	.....	230
Totals, Europe	\$70,472	\$3,345	\$61,988	\$196,763	\$46,178	\$449,297	\$225,514	\$6,242	\$86,866	\$21,876	\$27,170
SOUTH AMERICA:											
Argentina	\$19,333	.....	\$2,553	\$83,880	\$1,539	\$1,321	\$27,321	\$168	\$494	.....	.....
Bolivia	201	.....	.....	983	98	112	644	.....	.....	.....	.....
Brazil	9,436	\$69	670	74,028	2,867	57,578	22,823	1,994	40	.....	.....
Chile	23,374	278	632	19,360	4,063	18,155	12,494	.....	93	.....	.....
Colombia	790	.....	146	5,205	772	2,869	2,148	20	.....	.....	.....
Ecuador	128	.....	31	841	.....	473	1,195	.....	64	.....	.....
Guiana—British	74	.....	447	362	.....	13	198	.....	.....	.....	.....
.....Dutch .....	.....	.....	.....	91	.....	.....	33	2	.....	.....	.....
.....French .....	.....	.....	.....	40	.....	.....	3	.....	.....	.....	.....
Peru	4,173	.....	.....	348	786	1,295	7,598	71	218	.....	.....
Uruguay	2,354	.....	1,883	2,648	1,544	1,832	3,010	.....	1,296	.....	.....
Venezuela	1,728	.....	.....	12,194	1,116	2,668	3,811	17	.....	.....	.....
Totals, South America...	\$61,581	\$347	\$6,362	\$199,980	\$12,785	\$84,484	\$81,366	\$2,272	\$2,205	.....	.....
ASIA:											
China	\$910	.....	\$481	\$1,382	.....	\$32,195	\$1,816	.....	.....	.....	.....
British India	1,358	.....	.....	3,322	\$469	13	4,169	\$1,215	\$27	.....	.....
Straits Settlements	150	.....	726	2,424	6,334	.....	414	.....	.....	.....	.....
Dutch East Indies .....	.....	.....	.....	3,157	.....	4,080	921	.....	.....	.....	.....
Hongkong	56	.....	.....	1,190	568	1,010	78	.....	.....	.....	.....
Japan .....	.....	.....	2,385	.....	1,350	1,627	3,221	.....	.....	.....	.....
Russia in Asia	98	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Siam .....	.....	.....	.....	2,072	.....	3,762	38	.....	.....	.....	.....
Totals, Asia	\$2,572	.....	\$3,542	\$13,575	\$8,721	\$42,687	\$10,657	\$1,215	\$27	.....	.....
OCEANIA:											
British—											
Australia and Tasmania	\$3,483	\$265	\$10,482	\$7,064	\$623	\$9,654	\$14,395	.....	\$2,814	.....	.....
New Zealand .....	.....	354	.....	7,117	.....	1,606	2,187	.....	1,053	.....	.....
Philippine Islands	3,066	.....	8,325	7,216	56	13,457	7,754	.....	2,500	.....	.....
Totals, Oceania	\$6,549	\$619	\$18,807	\$21,397	\$1,149	\$21,717	\$24,336	.....	\$6,367	.....	.....
AFRICA:											
British Africa—											
West .....	.....	.....	\$241	\$260	.....	.....	\$188	.....	.....	.....	.....
South	\$28,411	.....	639	4,374	\$516	\$29	13,543	.....	\$438	.....	.....
East	186	.....	.....	.....	.....	.....	198	.....	.....	.....	.....
Canary Islands .....	.....	.....	.....	.....	.....	.....	.....	.....	20	.....	.....
Egypt .....	.....	.....	.....	.....	.....	1,399	278	.....	3,579	.....	.....
Portuguese Africa	248	.....	.....	.....	.....	.....	66	.....	148	.....	.....
Totals, Africa	\$28,845	.....	\$880	\$4,574	\$516	\$1,428	\$14,075	.....	\$4,185	.....	.....

* Manufactures of india rubber. † Manufactures of gutta percha.

British Trade in Rubber Goods.

IMPORTS OF MOTOR TIRES AND TUBES.*

From	1913	1914	1915
Russia	233,156	152,304	31,305
Germany	929,785	426,566	322
Belgium	246,397	116,025	
France	381,245	231,070	282,764
Switzerland	17,227	1,139	12,654
Italy	531,039	588,202	230,081
United States	224,428	270,550	1,225,422
Other Foreign Countries	4,180	2,198	32,564

Totals from Foreign Countries 2,557,342 1,888,054 1,815,112

Totals from British Possessions 141 4,572 169,451

Totals 2,557,483 1,892,626 1,984,563

EXPORTS OF MOTOR TIRES AND TUBES.

To—	1913	1914	1915
Denmark (including Faroe Islands)	18,039	15,156	32,168
Germany	30,994	16,207	
Netherlands	9,619	20,261	26,863
Belgium	84,870	29,256	
France	68,071	61,204	89,914
Italy	32,494	15,272	31,279
Brazil	25,521	17,557	21,449
Argentine Republic	115,994	27,064	54,829
Other Foreign Countries	69,341	70,307	87,684

Totals to Foreign Countries 454,943 272,284 344,186

Cape of Good Hope	59,148	48,505	70,346
Transvaal	33,616	31,263	27,357
British East Indies	93,995	72,934	74,031
Australia	16,606	30,960	44,068
New Zealand	27,278	34,817	61,405
Other British Possessions	23,338	24,782	43,605

Totals to British Possessions 253,981 243,261 320,812

Totals 708,924 515,545 654,998

*A change of classification took place on September 29, 1915, when motor cars and motor chassis became subject to duty. Prior to that date, tires and tubes imported with complete motor cars were not taken into account; now they are. As from September 29, also the value of parts and accessories of motor tires have been added.

IMPORTS OF MOTORCYCLE TIRES AND TUBES.

From	1913	1914	1915
Germany	28,420	8,811	
Belgium	1,823	76	
France	61,679	26,253	59,800
Other Foreign Countries	840	4,568	37,970

Totals from Foreign Countries 100,762 39,708 97,770

Totals from British Possessions 7,353

Totals 100,762 39,708 105,123

EXPORTS OF MOTORCYCLE TIRES AND TUBES.

To—	1913	1914	1915
Denmark	705	364	11,513
Germany	2,532	12,556	
Netherlands	1,806	2,666	3,787
Belgium	2,335	6,775	
Italy	1,099	5,300	7,685
Other Foreign Countries	3,577	7,191	11,423

Totals to Foreign Countries 12,054 24,552 34,408

Cape of Good Hope	4,042	4,037	8,511
Transvaal	6,005	8,801	5,418
British India	5,275	6,200	4,055
New Zealand	8,606	12,580	12,081
Other British Possessions	4,454	10,076	16,016

Totals to British Possessions 28,382 41,694 46,081

Totals 40,436 66,246 80,489

IMPORTS OF CYCLE TIRES AND TUBES.*

From	1913	1914	1915
Germany	35,175	34,991	
Belgium	5,082	3,566	
France	69,107	38,931	53,935
Other Foreign Countries	1,930	1,903	11,219

Totals from Foreign Countries 111,294 79,391 65,154

Totals from British Possessions 800 25

Totals 112,094 79,416 65,154

EXPORTS OF CYCLE TIRES AND TUBES.

To—	1913	1914	1915
Sweden	26,372	22,761	20,073
Denmark (including Faroe Islands)	45,554	58,668	74,978
Netherlands	48,791	60,605	132,842
Belgium	21,758	15,028	
Italy	24,578	16,633	14,843
Japan (including Formosa and Japanese leased territories in China)	88,786	19,504	1,189
Other Foreign Countries	36,358	31,941	29,851

Totals to Foreign Countries 292,197 225,140 283,776

Cape of Good Hope	34,121	16,865	14,888
Transvaal	25,572	23,289	20,214
British East Indies	45,727	38,888	75,551
New Zealand	11,152	10,281	14,229
Other British Possessions	12,780	16,086	22,391

Totals to British Possessions 119,352 105,409 147,273

Totals 411,549 330,549 431,049

*Not imported with complete cycles.

IMPORTS OF OTHER TIRES AND TUBES.*

From	1913	1914	1915
United States	7,835	11,889	19,994
Other Foreign Countries	767	55	623

Totals from Foreign Countries 8,602 11,944 20,617

Totals from British Possessions 8

Totals 8,610 11,944 20,617

EXPORTS OF OTHER TIRES AND TUBES.

To—	1913	1914	1915
Belgium	9,351	2,422	
France	10,205	8,195	3,084
Spain	4,963	3,036	3,929
Italy	4,943	2,341	550
Roumania	1,843	5,948	
Argentine Republic	14,456	3,056	8,448
Other Foreign Countries	22,604	20,086	22,877

Totals to Foreign Countries 68,365 45,084 38,888

British India	43,620	36,334	43,216
Straits Settlements and Dependencies (including Labuan)	9,989	10,734	8,559
Other British Possessions	11,314	15,820	24,329

Totals to British Possessions 64,923 62,897 76,104

Totals 133,288 107,981 114,992

*Not imported or exported with complete vehicle.

IMPORTS OF RUBBER BOOTS AND SHOES BY QUANTITY.

From—	1913	1914	1915
Germany	22,644	19,296	
France	3,887	5,427	3,128
United States	65,806	58,906	151,198
Other Foreign Countries	3,668	1,633	2,302

From—	1913.	1914.	1915.
Totals from Foreign Countries	Dozen Pairs. 95,705	Dozen Pairs. 85,262	Dozen Pairs. 156,628
Totals from British Possessions	66	86	3,834
Totals	95,771	85,348	160,462

EXPORTS OF RUBBER BOOTS AND SHOES BY QUANTITY.

To—	1913.	1914.	1915.
Germany	7,306	1,644	
Netherlands	3,283	4,242	
Belgium	7,821	6,862	3,780
France	10,678	2,646	16,454
Austria-Hungary	1,700	606	
Turkey	14,767	8,654	
Other Foreign Countries	7,176	5,182	6,949

Totals to Foreign Countries 52,731 29,836 27,183

Cape of Good Hope	2,915	2,536	3,072
Natal	2,879	2,509	3,017
Transvaal	175	1,935	2,767
British East Indies	17,988	20,406	27,444
Australia	46,238	52,318	35,725
New Zealand	4,016	5,716	6,488
Other British Possessions	5,794	6,425	12,473

Totals to British Possessions 80,005 91,845 90,986

Totals 132,736 121,681 118,169

IMPORTS OF RUBBER BOOTS AND SHOES BY VALUE.

From	1913.	1914.	1915.
Germany	23,715	20,356	
France	3,027	5,101	2,770
United States	90,178	137,352	250,076
Other Foreign Countries	2,947	1,476	2,743

Totals from Foreign Countries 119,867 164,285 255,589

Totals from British Possessions 54 38 8,671

Totals 119,921 164,323 264,260

EXPORTS OF RUBBER BOOTS AND SHOES BY VALUE.

To—	1913.	1914.	1915.
Germany	8,328	1,664	
Netherlands	3,612	4,579	4,030
Belgium	9,260	7,419	
France	11,940	3,180	40,198
Austria-Hungary	2,002	666	
Turkey	14,199	9,743	
Other Foreign Countries	11,202	8,876	9,860

Totals to Foreign Countries 60,543 36,077 54,088

Cape of Good Hope	2,793	2,449	2,733
Natal	2,476	2,279	2,459
Transvaal	199	1,759	2,567
British East Indies	17,183	18,974	20,629
Australia	43,067	45,929	32,279
New Zealand	5,000	7,813	8,862
Other British Possessions	6,745	8,476	15,156

Totals to British Possessions 77,463 87,679 84,685

Totals 138,006 123,756 138,773

EXPORTS OF ENGINE AND BOILER PACKING BY QUANTITY.

To—	1913.	1914.	1915.
Russia	Cwts. 2,051	Cwts. 3,055	Cwts. 339
Sweden	1,418	1,927	1,821
Norway	2,225	3,018	4,368
Denmark (including Faroe Islands)	4,072	1,512	2,486
Germany	1,038	838	
Netherlands	2,390	3,352	3,109
Belgium	1,284	1,364	
France	1,737	897	823
Italy	345	319	590
*Egypt	2,215	1,521	
China (exclusive of Hongkong, Macao and leased territories)	2,773	2,453	3,181
Japan (including Formosa and Japanese			

	1913. Cwts.	1914. Cwts.	1915. Cwts.		1913. £	1914. £	1915. £		1913.	1914.	1915.
Leased territories in China).....	1,986	1,495	314	New Zealand.....	6,671	7,518	8,661	United States.....	192,335	221,641	563,628
United States.....	1,658	2,858	2,079	Canada.....	13,194	9,156	6,412	Other Foreign Countries.....	13,854	12,306	15,330
Chile.....	2,844	1,447	1,124	Other British Possessions.....	13,816	12,391	13,991	Totals from Foreign Countries.....	715,559	632,460	626,012
Brazil.....	2,954	791	666	Totals to British Possessions.....	116,235	123,097	153,392	Totals from British Possessions.....	1,919	1,678	2,656
Argentine Republic.....	3,793	1,811	3,254	Totals.....	265,233	248,691	269,409	Totals.....	717,478	634,138	628,668
Other Foreign Countries.....	11,233	5,621	4,490								
Totals to Foreign Countries.....	45,310	34,279	28,638								
†Egypt.....			1,372								
Cape of Good Hope.....	712	694	541								
Natal.....	1,469	1,301	1,243								
Transvaal.....	1,152	1,710	3,532								
British India.....	10,774	15,456	14,874								
Straits Settlements and Dependencies (including Labuan).....	1,646	1,735	2,454								
Hongkong.....	1,749	3,319	2,751								
Australia.....	6,904	7,503	7,573								
New Zealand.....	3,336	5,578	3,948								
Canada.....	2,293	1,444	866								
Other British Possessions.....	2,596	2,666	3,560								
Totals to British Possessions.....	32,633	41,413	43,651								
Totals.....	77,943	77,692	72,289								
EXPORTS OF ENGINE AND BOILER PACKING BY VALUE.				IMPORTS OF APPAREL WATERPROOFED BY ANY PROCESS.							
To—	1913.	1914.	1915.	Totals from Foreign Countries.....	6,482	8,412	5,261	EXPORTS OF OTHER RUBBER MANUFACTURES.			
Russia.....	5,248	5,499	1,554	Totals from British Possessions.....	44	115	115	To—			
Sweden.....	6,065	6,401	5,885	Totals.....	6,482	8,456	5,376	Russia.....	50,813	38,758	16,734
Norway.....	6,447	7,998	13,793					Sweden.....	13,795	11,196	16,770
Denmark (including Faroe Islands).....	4,085	2,478	7,586					Denmark (including Faroe Islands).....	9,461	9,154	21,586
Germany.....	6,868	6,180	8,678					Germany.....	1,872	6,213	6,213
Netherlands.....	7,603	8,567	8,678					Netherlands.....	83,301	72,533	64,594
Belgium.....	10,565	6,387	10,517					Belgium.....	71,036	43,774	31
France.....	1,413	7,748	10,517					France.....	327,721	194,952	321,073
Italy.....	2,203	2,212	6,145					Switzerland.....	25,514	17,092	5,501
*Egypt.....	4,832	5,309						Spain.....	16,212	17,926	28,047
China (exclusive of Hongkong, Macao and leased territories).....	5,521	4,449	6,051					Italy.....	63,731	40,034	34,809
Japan (including Formosa and Japanese leased territories in China).....	5,645	8,851	2,703					Austria-Hungary.....	46,574	30,813	
United States.....	10,814	18,548	17,893					China (exclusive of Hongkong, Macao and leased territories).....	13,034	8,341	8,882
Chile.....	9,405	4,837	4,445					Japan (including Formosa and Japanese leased territories in China).....	29,580	15,460	12,198
Brazil.....	14,818	4,827	3,485					United States.....	41,887	45,041	21,197
Argentine Republic.....	10,135	4,835	6,909					Mexico.....	10,572	3,482	956
Other Foreign Countries.....	25,741	20,467	20,373					Colombia.....	11,647	6,449	2,322
Totals to Foreign Countries.....	148,908	125,594	116,017					Chile.....	15,939	11,122	5,772
†Egypt.....			7,964					Brazil.....	47,263	26,217	23,015
Cape of Good Hope.....	3,439	2,626	2,972					Argentine Republic.....	114,825	75,888	45,892
Natal.....	4,915	4,322	7,045					Other Foreign Countries.....	63,741	53,509	68,253
Transvaal.....	5,623	5,664	10,117					Totals to Foreign Countries.....	1,185,375	791,124	697,632
British India.....	30,563	47,311	53,573					Cape of Good Hope.....	33,501	26,689	41,168
Straits Settlements and Dependencies (including Labuan).....	9,653	3,394	8,168					Natal.....	26,189	19,212	18,084
Hongkong.....	5,155	6,787	5,240					Transvaal.....	29,234	23,005	23,114
Australia.....	23,296	18,928	29,148					British India, via:—			
								Bombay (including Karachi).....	24,780	24,197	31,189
								Madras.....	6,336	6,089	5,868
								Bengal, Assam, Bihar and Orissa.....	43,429	35,256	31,367
								Burma.....	8,107	7,978	8,008
								Hongkong.....	19,245	11,592	5,697
								Australia.....			
								Western Australia.....	11,824	8,449	7,484
								South Australia.....	12,504	9,451	6,297
								Victoria.....	42,806	35,516	23,785
								Queensland.....	7,051	7,845	7,836
								New South Wales.....	49,553	35,904	21,851
								Tasmania.....	2,014	1,673	1,225
								New Zealand.....	45,178	40,697	47,984
								Canada.....	68,710	56,439	38,857
								Other British Possessions.....	40,410	37,012	42,620
								Totals to British Possessions.....	470,871	387,004	362,434
								Totals.....	1,656,246	1,178,128	1,060,066

The average £ value for 1913 was \$4.864; for 1914, \$4.97; for 1915, \$4.745.
Compiled by the "India Rubber Journal," London.

UNITED KINGDOM RUBBER STATISTICS.

IMPORTS.

UNMANUFACTURED	August, 1916		Eight Months Ending August, 1916	
	Pounds.	Value.	Pounds.	Value.
Crude rubber:				
From Dutch East Indies.....	1,302,301	\$839,350	7,059,600	\$4,874,773
French West Africa.....	50,000	23,862	1,38,000	643,405
Gold Coast.....	99,800	29,617	1,202,700	481,480
Other countries in Africa.....	733,100	372,375	5,885,000	3,063,551
Peru.....	309,900	170,256	1,197,100	708,883
Brazil.....	1,309,500	711,706	16,338,200	10,784,297
British India.....	92,200	54,531	2,424,700	1,784,281
Straits Settlements and Dependencies, including Labuan.....	2,869,500	1,624,907	32,086,900	23,001,459
Federated Malay States.....	3,864,700	2,330,601	23,844,500	16,853,204
Ceylon and dependencies.....	2,010,600	1,220,573	13,915,000	9,936,334
Other countries.....	140,600	77,488	2,009,400	1,342,816
Totals.....	12,791,200	\$7,455,266	107,200,800	\$73,572,383
Waste and reclaimed rubber.....	312,800	\$35,833	4,183,900	\$542,920
Gutta percha.....	595,000	269,192	4,830,200	2,223,738
MANUFACTURED—				
Apparel, waterproofed.....		\$2,547		\$42,603
Boots and shoes.....dozen pairs	18,577	104,135	146,202	1,237,888

Insulated wire.....	26,318	402,463
Submarine cables.....		30,292
Automobile tires and tubes.....	460,183	8,772,383
Motorcycle tires and tubes.....	34,910	587,770
Cycle tires and tubes.....	47,767	377,051
Tires not specified.....	3,489	36,371

EXPORTS.

MANUFACTURED	August, 1916		Eight Months Ending August, 1916	
	Pounds.	Value.	Pounds.	Value.
Apparel, waterproofed:				
To France.....		\$17,574		\$271,234
British South Africa.....		21,406		127,665
British East Indies.....		2,447		108,191
Australia.....		32,539		211,100
New Zealand.....		16,151		128,207
Canada.....		71,806		235,307
Other countries.....		153,082		888,886
Totals.....		\$315,089		\$1,970,590
Boots and shoes.....dozen pairs	11,096	\$54,097	71,604	\$357,696
Insulated wire.....		228,299		1,644,250
Submarine cables.....		558,791		1,793,271
Automobile tires and tubes.....		653,976		3,965,755
Motorcycle tires and tubes.....		39,003		302,687
Cycle tires and tubes.....		202,348		2,270,803
Tires not specified.....		1,918		762,083
Manufactures not specified.....		841,958		5,290,345

EXPORTS—FOREIGN AND COLONIAL.

	August, 1916.		Eight Months Ending August, 1916.	
	Pounds.	Value.	Pounds.	Value.
UNMANUFACTURED				
Crude rubber:				
To Russia	2,006,100	\$1,257,073	8,592,400	\$6,092,642
France	2,279,700	1,133,289	14,040,900	9,919,683
United States	2,757,900	1,640,382	40,065,100	29,426,606
Other countries	1,018,400	661,197	12,056,900	8,414,550
Totals	8,062,100	\$3,692,541	74,755,300	\$53,853,481
Waste and reclaimed rubber..	41,500	\$8,654	439,200	\$75,829
Gutta percha	46,500	37,756	338,300	192,965
MANUFACTURED				
Automobile tires and tubes..				\$2,246
Motorcycle tires and tubes..				111,759
Cycle tires and tubes.....				79,009
Tires not specified.....				2,862,896
				58,487
				110,961
				5,716

LONDON AND LIVERPOOL RUBBER STATISTICS.

IMPORTS.
SEPTEMBER, 1916.

	London.		Liverpool.	
	Pounds.	Value.	Pounds.	Value.
UNMANUFACTURED				
Crude rubber:				
From German West Africa..			10,400	\$4,298
Other Dutch Possessions in Indian Seas	7,710	48,478		
French West Africa.....			22,700	10,224
Portuguese E. Africa	3,700	1,690		
United States		190	131,700	62,613
Brazil	44,500	18,421	1,523,900	835,756
Belgium			58,300	33,853
Belgium			400	252
Gold Coast			58,400	21,049
Nigeria			153,600	43,868
Cape of Good Hope.....		16,132		
British East Africa..	12,700	5,212	400	519
Zanzibar		3,594		
Seychelles	800	533		
Aden			100	52
British India		226,547		
Straits Settlements...	3,165,900	1,522,562	544,700	295,625
Fed. Malay States...	6,428,500	4,019,934	21,000	10,605
Ceylon	2,628,600	1,558,419	62,100	37,637
British North Borneo		154,514		
New South Wales....		4,070		
Fig Islands	4,200	1,142		
British West Indies..	2,000	1,418		
British Guiana	300	143	800	47
Totals	13,781,300	\$8,076,641	2,267,500	\$1,190,645

Waste and reclaimed rubber:				
From France	13,400	\$771	200	
United States	12,400	1,523	46,000	7,102
Argentina	15,000	1,000	15,200	1,071
Cape of Good Hope..	300	14		
Natal	9,500	1,223		
New Zealand	5,000	890		
British West Indies..	10,400	238		
Totals	71,100	\$6,611	61,500	\$8,202

EXPORTS.

Waste and reclaimed rubber				
United Kingdom				
To France	10,200	\$1,428		
Spain	44,900	3,303	1,400	\$248
Italy	137,400	7,521	2,500	562
United States	346,800	22,010	900	67
Russia			134,400	27,061
Denmark			6,700	1,228
Japan			45,600	6,750
Totals	539,300	\$31,962	191,500	\$35,916

RE-EXPORTS.

Crude rubber:				
To Russia			970,100	\$605,377
Sweden	71,900	\$3,544	11,500	10,472
Norway	15,700	8,568	6,800	4,284
Denmark	100,700	60,090	10,300	3,151
France	1,324,800	702,700	560,100	341,030
Spain	22,900	17,731	23,200	12,638
Italy	235,200	154,214	89,600	45,249
Japan			10,500	7,378
United States	2,610,100	1,465,057	69,200	33,453
Argentina	8,800	7,116		
Victoria			20,800	17,184
New South Wales.....	600	357		
Canada	197,500	117,743	2,500	1,276
Totals	4,588,200	\$2,577,520	1,780,300	\$1,081,492
Waste and reclaimed rubber:				
To France	1,800	\$219	2,400	\$286

IMPORTS AND EXPORTS OF RUBBER AND GUTTA AT SINGAPORE.*

From—	August, 1916.				
	Para Rubber.	Para Rubber for Treatment.	Borneo Rubber.	Gutta Percha.	Gutta Jelutong.
IMPORTS.					
Malay Peninsula—					
Port Swettenham	1,168,932	11,500			
Teluk Anson	8,000	7,600			
Muar	504,800	4,533			
Malacca	379,633	433,466			
Penang	290,266	2,266			
Kelantan	245,733	7,733			
Port Dickson	76,933	86,400			
Kuantan	37,866				
Rengas	13,866				
Mersing	532				
S. Pandjang	532				
Totals	3,551,094	556,798			
Borneo—					
Santapan		13,466	1,733	4,533	354,933
Pontianak	60,033	4,400	3,466	8,266	3,333
Bandar Abbas	28,800	30,133		4,000	48,000
Sabah	20,533			666	13,333
Lahad	19,600	1,200			108,400
Shah	19,466		800	4,000	45,733
Belaga	14,800	101,466	133	1,733	
Pahang	10,133				
Sandakan			666		
Kudat	6,368	6,933		133	
Singawang	400				
Samarinda	266		1,066	2,000	
Totals	257,999	177,064	7,864	25,331	573,732
Sumatra—					
Toba	197,866			800	
Deli	87,600	327,600			
Belawan	34,133				
Indragiri	9,466	17,333			17,600
Asahan	7,466	80,666			
Sekeloa	1,600				
Pahang	5,866				52,800
Muntok	3,333				
Bengkalis	933				
Totals	353,329	427,199		800	70,400
Lava					
Sunda	4,133				
Batavia	43,066				
Totals	125,199				
Siam					
Bangkok	800				
Patani	133				
Totals	933				
Other Ports	201,533	204,870	4,933	13,600	37,333
Grand Totals	4,490,087	1,365,931	12,797	39,731	681,465
EXPORTS.					
August, 1916.					
To—					
NORTH AMERICA:					
United States—					
Albany	1,244,000			112,933	259,066
New York	88,500	104,666			31,600
San Francisco	11,200	6,666			25,200
Boston	8,533				
Canada					
Ontario (Toronto) ..	51,600				
Totals	3,400,000	1,946,500		112,933	315,866
EUROPE:					
United Kingdom—					
England					
London	573,333	1,320,000		324,266	22,933
Liverpool	245,200	239,200		127,066	132,400
Russia (Vladivostok) ..	80,000				
France (Marseilles) ..	2,500				
Totals	1,705,999	1,559,200		451,332	155,333
Grand Totals	4,746,665	1,688,665		564,265	471,199

*Not complete. Imports and Exports from August 1 to August 11, inclusive, not received at this office.

RUBBER STATISTICS FOR CANADA.
IMPORTS OF CRUDE AND MANUFACTURED RUBBER.

UNMANUFACTURED—free:	July, 1916.		Four Months Ending July, 1916.	
	Pounds.	Value.	Pounds.	Value.
Rubber and gutta percha, crude caoutchouc or india rubber:				
From Great Britain	156,072	\$104,001	1,447,319	\$1,028,207
United States	247,701	132,251	1,307,851	793,041
Straits Settlements			33,849	21,607
Other countries			2,217	1,891
Totals	403,773	\$236,252	2,791,236	\$1,844,746
Rubber, re-covered:				
From Great Britain	11,470	\$1,513	30,219	\$5,123
United States	457,418	64,901	1,512,478	211,806
Totals	468,887	\$66,414	1,542,697	\$216,929

	July, 1916.		Two Months Ending July, 1916.	
	Pounds.	Value.	Pounds.	Value.
UNMANUFACTURED—free:				
Hard rubber, in sheets and rods:				
From United States	5,372	\$4,234	7,401	\$5,947
Rubber substitute:				
From United States	50,417	\$4,112	220,258	\$18,736
Rubber, powdered, and rubber or gutta percha waste:				
From Great Britain			81,052	\$5,274
United States	23,804	\$3,082	421,340	\$1,459
Other countries	347	20	4,275	188
Totals	24,151	\$3,102	506,667	\$36,921
Rubber thread, not covered:				
From United States	3,695	\$5,251	15,345	\$23,582
Balata, crude:				
From United States	55	\$30	4,774	\$3,463
Chicle, crude:				
From United States	8,340	\$2,727	165,689	\$62,876
British Honduras	122,342	45,763	932,973	344,296
Mexico	196,633	97,987	196,794	98,077
Totals	327,315	\$146,477	1,295,456	\$505,249
	July, 1916.		Four Months Ending July, 1916.	
	General Tariff. Value.	Preferential Tariff. Value.	General Tariff. Value.	Preferential Tariff. Value.
MANUFACTURED—dutiable:				
Waterproof clothing:				
From Great Britain	\$127	\$41,255	\$147	\$122,613
United States	29,171		114,016	
Totals	\$29,298	\$41,255	\$114,163	\$122,613
Hose, lined with rubber:				
From Great Britain		\$155		\$155
United States	\$6,708		\$34,385	
Totals	\$6,708	\$155	\$34,385	\$155
Mats and matting:				
From Great Britain		\$57		\$66
United States	\$32		\$1,630	
Totals	\$32	\$57	\$1,630	\$66
Packing:				
From Great Britain		\$294		\$405
United States	\$6,678		\$29,841	
Other countries	4		4	
Totals	\$6,682	\$294	\$29,845	\$405
Tires of rubber for all vehicles:				
From Great Britain	\$1,054	\$2,585	\$4,268	\$9,269
United States	92,557		366,365	
France			1,832	
Other countries			182	
Totals	\$93,611	\$2,585	\$372,647	\$9,269
*Rubber cement, and all other manufactures of india rubber and gutta percha, N. O. P.:				
From Great Britain		\$20,071	\$985	\$89,246
United States	\$64,268		271,115	
Other countries	5		406	
Totals	\$64,303	\$20,071	\$272,506	\$89,246
Hard rubber, in tubes:				
From United States	\$733		\$1,656	
Boots and shoes:				
From Great Britain				\$936
United States	\$5,480		\$31,427	
Totals	\$5,480		\$31,427	\$936
Belting:				
From Great Britain				\$247
United States	\$3,897		\$15,539	
Totals	\$3,897		\$15,539	\$247
Webbing—over one inch wide:				
From Great Britain		\$1,384	\$22	\$4,489
United States	\$21,794		82,422	
Other countries	25		25	
Totals	\$21,819	\$1,384	\$82,469	\$4,489

*In addition the imports of rubber cement and all manufactures of india rubber and gutta percha not otherwise provided for amounted to \$29 from Great Britain and \$1,163 from various countries for July; and \$87 from Great Britain and \$2,710 from various countries for the four months ending July, 1916, the values being at treaty rates.

EXPORTS OF DOMESTIC AND FOREIGN RUBBER GOODS.

	July, 1916.		Four Months Ending July, 1916.	
	Produce of Canada. Value.	Re-exports of foreign goods. Value.	Produce of Canada. Value.	Re-exports of foreign goods. Value.
MANUFACTURED				
Belting:				
To Newfoundland	\$347		\$1,734	

Hose:				
To Great Britain	\$5,150		\$112,656	
United States			1,335	\$125
Newfoundland	532		1,513	
Other countries	932		3,751	
Totals	\$6,614		\$119,255	\$125
Boots and shoes:				
To Great Britain	\$32,764		\$167,194	
United States	16		87	\$252
Newfoundland	1,193		3,276	
Australia	4,390		6,709	
New Zealand	2,099		4,359	
Other countries	454		3,629	
Totals	\$41,516		\$185,254	\$252
Clothing:				
To United States		\$41		\$57
Newfoundland	\$428		\$578	
Totals	\$428	\$41	\$578	\$57
Tires:				
To Great Britain	\$9,925		\$134,471	
United States	15,313	\$27,657	45,541	\$30,498
Newfoundland	173		2,966	
Other countries	28,413		93,916	
Totals	\$54,124	\$27,657	\$266,894	\$30,498
*Rubber waste:				
To Great Britain	\$5,058		\$14,078	
United States	8,456		62,479	
Totals	\$13,514		\$76,557	
All other mnfs., N. O. P.:				
To Great Britain	\$3,739		\$26,675	
United States	249	\$2,090	781	\$3,538
Newfoundland	303		1,150	
New Zealand	319		343	
Other countries	265		1,387	516
Totals	\$4,895	\$2,090	\$30,336	\$4,054
†Gum chicle:				
To United States	\$174,342		\$541,463	
Other countries			1,704	
Totals	\$174,342		\$543,167	

*During July 42,100 pounds of rubber waste was exported to Great Britain and 184,300 pounds to the United States; making a total of 117,200 pounds to Great Britain and 915,000 pounds to the United States for the four months ending July, 1916.

†During July 323,587 pounds of gum chicle was exported to the United States, and 2,250 pounds to various countries, and 965,579 pounds to the United States for the four months ending July, 1916.

RUBBER STATISTICS FOR ITALY.
IMPORTS OF CRUDE AND MANUFACTURED RUBBER.

	Six Months Ending June, 1915.		Six Months Ending June, 1916.	
	Pounds.	Value.	Pounds.	Value.
UNMANUFACTURED—				
India rubber and gutta percha—raw and reclaimed:				
From Great Britain.....			1,635,860	
Straits Settlements.....	1,848,000		1,079,760	
African Fr. Colony..	32,120		6,380	
Belgian Congo			199,320	
Brazil	4,161,740		3,064,160	
Other countries	275,660		702,900	
Totals	6,317,520	\$4,433,750	6,688,380	\$4,729,118
Rubber scrap	631,620	49,859	3,818,100	301,556
MANUFACTURED—				
India rubber and gutta percha—threads:				
From United States	16,060		31,900	
Great Britain	16,060		15,620	
Other countries	1,760		3,740	
Totals	33,880	\$59,444	51,260	\$89,938
India rubber and gutta percha—sheets:				
Cut sheets	1,760	\$2,625	1,980	\$2,953
Elastic fabric	3,300	1,303	220	87
Insulated wire	440	116	440	116
Hard rubber	7,040	4,941	27,060	18,991
India rubber and gutta percha—tubes:				
Cut sheets	881	\$1,390	1,100	\$1,737
Elastic fabric:				
From Austria-Hungary ..	880			
Germany	5,500			
Other countries ..	30,360		4,620	
Totals	36,740	\$19,339	4,620	\$2,432
Other forms	2,200	\$1,351	3,080	\$1,891
Belting	38,940	\$23,913	77,660	\$47,690
Rubber coated fabrics...pieces	53,240	\$65,388	71,060	\$87,275
Other forms:				
From Great Britain	22,220		25,080	
Other countries ..	1,100		220	
Totals	23,320	\$20,458	25,300	\$22,195

	Six Months Ending June, 1915.		Six Months Ending June, 1916.		Other rubber manufactures:	Six Months Ending June, 1915.		Six Months Ending June, 1916.	
	Pounds.	Value.	Pounds.	Value.		Pounds.	Value.	Pounds.	Value.
Boots and shoes:									
From United States			15,070		From United States	7,700		32,780	
Germany	1,531				Salvage	72,600		12,980	
Other countries	95				Argentina	48,620		53,240	
Totals		\$13,842	25,491	\$24,599	Other countries	183,480		121,220	
Elastic webbing:					Totals		\$6,373,974	220,220	\$154,554
From United States	5,500		14,520						\$9,492,421
Germany	26,840		15,620						
Other countries	12,540								
Totals	54,780	\$72,085	31,020	\$40,140					
Elastic fabric—specified:									
From United States	9,460		199,980						
Germany	15,180		80,340						
Other countries	4,180		6,600						
Totals	126,280	\$99,704	286,880	\$226,505					
Tires:									
From United States	100,480		367,620						
Germany	2,420		22,220						
Great Britain	135,080		229,020						
Other countries	18,700								
Totals	316,580	\$555,454	618,860	\$1,085,818					
Other rubber manufactures:									
From United States	1,700		891,660						
Austria-Hungary	13,640								
France	289,740		767,580						
Germany	63,140								
Great Britain	341,440		429,220						
Other countries	2,420		880						
Totals	807,880	\$557,328	1,089,340	\$1,466,182					
Total Imports		\$6,000,000		\$8,149,503					

EXPORTS OF CRUDE AND MANUFACTURED RUBBER.

	Six Months Ending June, 1915.		Six Months Ending June, 1916.	
	Pounds.	Value.	Pounds.	Value.
UNMANUFACTURED—				
India rubber and gutta percha—raw and reclaimed	222,640	\$53,838	639,320	\$224,343
MANUFACTURED—				
India rubber and gutta percha—threads:				
To Germany	5,720			
Great Britain			1,760	
Argentina	2,420		3,740	
Other countries	30,800		22,000	
Totals	38,990	\$68,322	7,500	\$48,250
India rubber and gutta percha—sheets:				
Cut sheets	5,500	\$8,202	3,080	\$4,593
Elastic fabric	1,540	608	1,540	608
Insulated wire	1,100	289	600	174
Hard rubber	30,240	14,205	42,900	30,108
India rubber and gutta percha—tubes:				
Cut sheets			9,020	\$14,243
Elastic fabric	52,800	\$27,792	51,040	26,866
Other forms	32,780	20,130	78,540	48,231
Belting	1,980	1,216	1,540	946
Boots and shoes	50	48		
Elastic webbing:				
To France	880		4,180	
Greece	26,620		45,760	
Egypt	1,980		13,860	
Argentina	27,280		68,640	
Brazil	34,980		55,440	
Cuba	19,580		19,140	
Other countries	30,360		102,960	
Totals	141,680	\$186,438	309,980	\$407,905
Elastic fabric—not specified:				
To Spain	600		440	
Argentina	1,540		14,080	
Brazil			200	
Uruguay	1,100		1,760	
Other countries	2,200		8,580	
Totals	5,440	\$9,650	25,080	\$44,004
Tires:				
To France	100,480		102,080	
Great Britain	54,120		66,220	
Switzerland	215,160			
India and Ceylon	130,680		72,800	
Australia	16,720		57,860	
Argentina	394,460		761,860	
Brazil	197,780		448,580	
Other countries	2,165,680		321,640	
Totals	3,279,760	\$5,763,988	4,836,920	\$8,487,596

THE MARKET FOR RUBBER SCRAP.

Copyright, 1916.

NEW YORK.

Tell rubber scrap market has shown a tendency to gradually work upward in sympathy with the advancing position of crude rubber. The flurry caused by the German submarines along our coasts stiffened prices somewhat, and although the scare was of short duration, it added to the strength of the dealers' position.

The opinion that the reclaimers are doing a good business is supported by reports that the rubber mills are already busy on the regular fall and winter work. That the rubber scrap market will feel the result of this activity before long is the belief of the large dealers who are holding out for better prices, and in fact the small dealers are equally adverse to letting go their holdings at the present ruling prices. Purchases therefore have been usually of small volume and the general business has only been fair for the month and this particular period.

BOOTS AND SHOES.—These have been quiet and more or less unsettled during the month as the mills have not appeared to be greatly interested in the prevailing nominal quotation of 9½ cents delivered. The diversity of opinion as to the available stocks and supplies and the absence of marked activity has failed to establish set prices in this material.

AUTO TIRES.—If anything, the tire situation has developed a certain amount of strength in October. Toward the end of the month, activity was noticed particularly in mixed tires. Offers were made of 6½ cents delivered, and sales at 6½ delivered were reported. G. & G. tires have been quiet and considered a dealers' proposition. Reclaimers are quoted as saying that at present price of 8½ cents for this grade works out at a loss to them.

INNER TUBES.—The tone of inner tubes has been a little stronger of late due to the rubber position, although activity has been lacking in all grades. Dealers are reported to be carrying comparatively limited stocks and delivered prices have ranged between 25 and 25½ cents.

MECHANICALS.—All grades have been inactive, but the indications for good fall business are encouraging. Hose has been particularly steady and prices throughout the entire list are practically unchanged.

London imports of waste and reclaimed rubber for September were 71,100 pounds; Liverpool, 61,500 pounds. Re-exports were: London, 1,800 pounds; Liverpool, 2,400 pounds. The September exports of waste and reclaimed rubber manufactures of the United Kingdom were: London, 539,300 pounds; Liverpool, 191,500 pounds.

NEW YORK QUOTATIONS FOR CARLOAD LOTS DELIVERED.

OCTOBER 28, 1916.

Prices subject to change without notice.

	Per Pound.
Boots and shoes	\$0.09½ @
Trimmed acetates	.07½ @
White tires, Goodrich and Goodyear	.08½ @
Auto tires, standard white	.06½ @
standard mixed	.06½ @
stripped, unguaranteed	.04½ @
Auto peelings, No. 1	.08½ @
No. 2	.08½ @
Inner tubes, No. 1	.25½ @
No. 2	.11½ @
Irony tires	.02½ @
Bicycle tires	.04½ @
Solid tires	.05½ @
White scrap, No. 1	.13½ @ .14
No. 2	.10 @
Red scrap, No. 1	.10 @ .11
No. 2	.08 @
Mixed black scrap, No. 1	.04½ @
No. 2	.04 @
Rubber car springs	.04½ @
Horse shoe pads	.04 @
Matting and packings	.11 @
Garden hose	.01 @
Air brake hose	.05½ @
Cotton fire hose	.02 @
Large hose	.01½ @
Hard rubber scrap, No. 1, bright fracture	.25 @
Battery jars (black compound)	.02 @
Insulated wire stripping	.03 @
Rubber heels	.03¾ @

THE MARKET FOR COTTON AND OTHER FABRICS.

Copyright, 1916.

NEW YORK.

THE advance in cotton during the month just passed has recorded figures unprecedented since 1874. January quotations have touched 19.60 cents, practically realizing the prediction of a month ago, of 20 cent cotton, and now the bull side of the market is forecasting 25 cent cotton by January 1. The inclination to discount crop estimates and unfavorable weather reports from India, together with heavy local buying orders, are the prime factors in this movement.

The prevailing abnormal prices of American, as well as Sea Island and Egyptian cotton, would warrant the belief that these levels may not be long sustained, unless supported by a continuance of the unusual conditions now controlling the market.

SEA ISLAND COTTON. There has been an active demand both in the Charleston and Savannah markets, and prices have steadily advanced. By the middle of October it was difficult to buy any quantity at less than 40 cents for round lots. The buying has been general, on account of both Northern and Southern mills, as well as on speculation. On October 20 the crop in sight at all ports was 32,057 bales, against 19,678 bales last year. Fancy Georgias and Floridas were selling at 39½ to 40 cents.

EGYPTIAN COTTON. Mail advices from Alexandria under date of September 19, indicate a very excited market and violent price fluctuations due to lack of selling interest. Climatic conditions have improved and all the Delta districts are now engaged in the first picking, but the results are inferior to last year. The bolls of the second picking appear to have suffered considerably from the pink boll worm and the third picking will undoubtedly suffer from the same cause. Exports from Alexandria from August 1 to September 13, 1916, were 17,623 bales, of which Great Britain imported 13,114; the Continent 3,176; United States 1,133 and India and Japan 200 bales. For the same period last year the total exports were 48,520 bales, of which Great Britain imported 20,364 bales; the Continent 14,383; United States 12,748, and India and Japan 1,025 bales. On October 25, Brown Egyptian cotton was 39 cents and Sakelardides was 46 to 48 cents.

HOSE AND BELTING DUCK. The demand has been active in a firm market and prices have advanced 5 to 6 cents a pound during the month. The mills are sold into May and July next year, and are making regular deliveries on contracts. The labor situation is not so acute as with the northern mills and strikes have not seriously interfered with production.

SHEETINGS, OSNABURGS, ENAMELING DUCK AND DRILLS. Steady buying during the month resulted in rapidly advancing prices that show gains of 2 to 4 cents over quotations published a month ago. Sheetings that normally sell for 4½ cents are now selling for 9½ cents. The demand is of domestic origin and apparently devoid of speculative features. Under the present cotton market conditions, there is small prospect of lower prices.

TIRE FABRICS. The situation at present, concerning both buyer and seller, may be described as chaotic. While most of the largest consumers are protected by contracts, there are many buyers who are unable to secure necessary supplies, or definite assurances for the future. The seller is confronted with abnormal prices for raw material, moreover, a 25 per cent shrinkage in the production of tire fabrics is reported. The fabric mills are now confronted with trouble in obtaining sufficient yarn for their requirements and the difficulties surrounding the labor situation are rather worse than better.

Sea Island building fabric has advanced 5 to 10 cents the square yard, and Egyptians have gone up 15 to 20 cents. Sixteen months ago tire fabric was selling for 16 cents, to-day the same material is around 80 cents. The result will be greater demand for Peeler fabrics and increased sales of unguaranteed tires.

NEW YORK QUOTATIONS.

OCTOBER 31, 1916.

Prices subject to change without notice.

Aeroplane and Balloon Fabrics:			
Wamsutta, S. A. I. L. No. 1, 40-inch.....	yard	\$0.32½	@
No. 4, 38½-inch.....		.32	@
O/X B. 36-inch.....		.31	@
Wool Stockinettes—52-inch:			
A—14-ounce.....	yard	1.25	@
B—14-ounce.....		1.50	@
C—14-ounce.....		1.75	@
Cotton Stockinettes—52-inch:			
D—14-ounce.....	yard	.50	@ .55
E—11½ ounce.....		.42	@ .50
F—14-ounce.....		.55	@ .60
G—8-ounce.....		.48	@ .50
H—11-ounce.....		.50	@ .55
I—9-ounce.....		.42	@ .45
Colors—white, black, blue, brown.			
Tire Fabrics:			
17¼-ounce Sea Island, combed.....	square yard	1.00	@ 1.10
17¼-ounce Egyptian, combed.....		.90	@ 1.00
17¼-ounce Egyptian, carded.....		.87	@ .97
17¼-ounce Peelers, carded.....		.60	@ .65
Sheeting:			
40-inch 2.35-yard.....	yard	.15	@
40-inch 2.50-yard.....		.14	@
40-inch 2.70-yard.....		.13	@
40-inch 2.85-yard.....		.12½	@
40-inch 3.15-yard.....		.12¼	@
Osnaburgs:			
40-inch 2.25-yard.....	yard	.15½	@
40-inch 2.48-yard.....		.14½	@
37½-in. 2.42-yard.....		.14¼	@
Mechanical Ducks:			
Hose.....	pound	.36	@ .37
Belting.....		.36	@
Carriage Cloth Duck:			
38-inch 2.00-yard enameling duck.....	yard	.18½	@
38-inch 1.74-yard.....		.20½	@
72-inch 16.66-ounce.....		.38½	@
72-inch 17.21-ounce.....		.40	@
Drills:			
38-inch 2.00-yard.....	yard	.18	@
40-inch 2.47-yard.....		.14¼	@
52-inch 1.90-yard.....		.19	@
52-inch 1.95-yard.....		.18½	@
60-inch 1.52-yard.....		.24¼	@
Yarns:			
Garden Hose, 12/2 cabled.....	pound	.35	@
Fire Hose 12/1.....		.33	@
Imported Woolen Fabrics Specially Prepared for Rubberizing—Plain and Fancies:			
63-inch, 3¼ to 5 ounces.....	square yard	.38	@ 1.55
36-inch, 2¾ to 5 ounces.....		.35	@ .85
Imported Plaid Lining (Union and Cotton):			
63-inch, 2 to 4 ounces.....	square yard	.35	@ .75
36-inch, 2 to 4 ounces.....		.25	@ .50
Domestic Worsted Fabrics:			
36-inch, 4½ to 8 ounces.....	square yard	.32½	@ .57½
Domestic Woven Plain Linings (Cotton):			
36-inch, 3¼ to 5 ounces.....	square yard	.15½	@ .20
Raincoat Cloth (Cotton):			
Bombazine.....	yard	.07¾	@ .08
Twills.....		.12	@ .18
Tweed.....		.25	@ .35
Tweed, printed.....		.07½	@ .15
Plaid.....		.08½	@ .10
Repp.....		.22½	@ .27
Burlaps:			
32—7½-ounce.....	100 yards	6.30	@
40—7½-ounce.....		7.35	@
40—8-ounce.....		7.50	@
40—10-ounce.....		8.35	@
40—10½-ounce.....		8.50	@
45—7½-ounce.....		8.00	@
45—8-ounce.....		8.15	@
48—11-ounce.....		11.00	@

THE MARKET FOR CHEMICALS AND COMPOUND-INGREDIENTS.

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NEW YORK.

CONSIDERABLE activity has characterized the rubber chemical market during October. Inquiry has been good and the demand quite up to normal, while prices, with a few exceptions, have undergone but little change since a month ago. The mills are now looking to their forward requirements and contracts are being written covering supplies for 1917.

ANTIMONY SULPHURET. There has been a steady demand for both crimson and golden antimony. Prices have remained practically the same as a month ago.

BARYTES. The demand has been good for all grades, with prices ruling at about the same level as last month. Export demand is reported to be increasing, which is confirmed by recent over-sea shipments. Foreign grades were comparatively scarce.

LITHARGE. This pigment has had a steady demand, due to the mills coming into the market for supplies. New contracts are being written and deliveries on old accounts are promptly called for. The firm prices ruling have been due to the steady position of the metal market.

LITHOPONE. The market for this material has been quiet but later in the month offers were freely made on spot and forward positions. Prices are about the same as a month ago. Contracts covering next year's requirements are now being placed.

ZINC OXIDE. The demand has increased and there is a steady call for deliveries on contracts. The producers are disposing of their output through contracts only, and the consuming trade is obliged to cover its requirements in this way. The new prices which went into effect October 1, cover a period of three months, so there will be no change until the first of the year.

DRY COLORS. Trade has been good, especially in red oxides, due to the tire demand that is at present extraordinary. Ultramarine blue has been well sold up, but recently supplies appear to be easier.

WHITING. The consumption of whiting continues steadily, with prices unchanged and firm. The difficulties in securing supplies of the raw material have greatly increased the cost of production, which accounts for the present steady price levels.

NEW YORK QUOTATIONS.

OCTOBER 28, 1916.

Subject to change without notice.

Acetone (drums)	lb.	Nominal
Acid, acetic, 28 per cent. (bbils.)	lb.	\$0.09 1/2 @ .93
cresylic (crude)	gal.	1.00 @
glacial, 99 per cent. (carboys)	lb.	.20 @
muriatic, 20 degrees	lb.	1.10 @
nitric, 36 degrees	lb.	.00 @
sulphuric, 50 degrees	lb.	.00 @
Alumina Pigment, No. 1 (casks)	ton	10.00 @
Aluminum Flake (carloads)	ton	1.00 @
Ammonium carbonate	lb.	.10 @ .10 1/2
Antimony, crimson, sulphuret of (casks)	lb.	.45 @ .55
crimson, "Mephisto" (casks)	lb.	.60 @
golden, sulphuret of (casks)	lb.	.28 @ .35
golden, "Mephisto"	lb.	.30 @
golden, sulphuret, States brand, 16-17 per cent. lb.	lb.	.35 @
Asbestos	ton	17.50 @
Asbestos	ton	20.00 @
Asphaltum "G" Brilliant	lb.	.03 @
Barium sulphate, precipitated	ton	1.00 @
Barytes, pure white	ton	30.00 @ 32.50
off color	ton	17.50 @
Benzol, pure	gal.	.65 @
Beta-Naphthol	lb.	1.10 @
Black Hops	lb.	.20 @ .75
Bone ash	lb.	.44 @ .68
Cadmium tri-sulphate (f. o. b. London)	lb.	2.75 @
sulphide, yellow	lb.	2.00 @ 2.20
Carbon, bisulphide (drums)	lb.	.05 1/2 @
black (cases)	lb.	.18 @ .20
tetrachloride (drums)	lb.	.18 @
Caustic soda, 76 per cent.	lb.	.04 1/2 @
Chalk, precipitated, extra heavy	lb.	.40 @
precipitated, heavy	lb.	.04 @ .05
China clay, domestic	lb.	.01 1/2 @
imported	lb.	.02 @
Chrome, green	lb.	.20 @
yellow	lb.	.26 @
Cotton linters	lb.	.02 1/2 @
Fossil flour	lb.	.18 @ .20
Gas black	lb.	.18 @ .20
commercial	lb.	.35 @ .40
low grade	lb.	.11 @ .16
Glycerine, C. P. (drums)	lb.	.52 1/2 @
Graphite, flake (400 pound bbl.)	lb.	.15 @
powdered (400 pound bbl.)	lb.	.65 @
Green oxide of chromium (casks)	lb.	.10 @
Ground glass	lb.	.06 @
Indian red, reduced grades	lb.	.06 @ .07
pure	lb.	.07 @ .08 1/2
Intusorial earth, powdered	ton	60.00 @
bolted	ton	65.00 @

Iron oxide, red, reduced grades	lb.	.03 1/2 @ .04
red, pure, bright	lb.	.11 @ .12
Ivory, black	lb.	.20 @ .25
Lampblack	lb.	.25 @
Lead, red oxide of	lb.	.09 3/4 @
sublimed blue	lb.	.08 1/2 @
sublimed white	lb.	.08 1/2 @
white, basic carbonate	lb.	.08 3/4 @
white, basic sulphate	lb.	.08 3/4 @
Lead, blue	lb.	.01 1/2 @ .01 1/2
Litharge	lb.	.09 3/4 @ .10
English	lb.	.12 @ .13 1/2
sublimed	lb.	.09 1/2 @
Lithopone, domestic	lb.	.07 1/2 @
imported	lb.	Nominal
Magnesia, carbonate	lb.	.12 @
calcined, heavy	lb.	.11 @
heavy, Thistle Brand	lb.	.14 @
light	lb.	.30 @
Magnetite, calcined, powdered	ton	35.00 @ 39.00
Mica, powdered	lb.	.03 1/2 @ .05 1/2
Mineral rubber	lb.	.01 @ .02
"M. R. X"	ton	100.00 @
"Genasco"	ton	36.50 @
"J. M. R."	ton	50.00 @
"Richmond Brand"	lb.	.03 @
"No. 64 Brand"	ton	38.00 @
"Red Elastic"	lb.	.05 @
"Rubber"	ton	35.00 @
Naphtha, stove gasolene (steel bbls.)	gal.	.22 @
66@68 degrees (steel bbls.)	gal.	.27 @
68@70 degrees (steel bbls.)	gal.	.28 @
V. M. & P. (steel bbls.)	gal.	.21 @
Oil, aniline	lb.	.25 @
corn, refined	cwt.	12.01 @
linseed (bbl.)	gal.	.87 @
palm	gal.	.10 @
paraffin	gal.	.17 @
pine (cases)	gal.	.65 @
rapeseed	gal.	1.00 @ 1.05
rosin, heavy body	gal.	.38 @
tar (cases)	gal.	.21 1/2 @
soluble aniline colors, yellow, orange, red, violet, blue, green	lb.	.10 @ .75
Orange mineral, domestic	lb.	.12 @
Paragol (carloads)	cwt.	10.29 @
Petroleum	lb.	.06 1/2 @
Petroleum grease	lb.	.04 1/2 @
Pine solvent	lb.	None
Pine tar	bbl.	7.65 @
Pitch, burgundy	lb.	.03 3/4 @ .05
cedar	lb.	4.50 @
pine	lb.	.02 @
Plaster of paris	lb.	1.50 @ 1.70
Prussian blue	lb.	1.30 @ 1.80
Pumice stone, powdered (bbils.)	lb.	.03 @ .04
Resin, Pontianak, refined	lb.	.22 @
granulated	lb.	.15 @
fused	lb.	None
Rosin (280 pound bbls.)	bbl.	6.00 @ 7.75
Rotten stone, powdered	lb.	.02 1/2 @ .04
Rubber black	lb.	.06 @
Rubber substitute, black	lb.	.08 @ .11
white	lb.	.12 1/2 @ .17
brown	lb.	.12 1/2 @ .18
Rubhide	lb.	Nominal
Shellac, fine orange	lb.	.33 @ .35
Soapstone, powdered	ton	12.00 @ 15.00
Starch, corn, powdered	lb.	.04 @
Sulphur chloride (drums)	lb.	.09 @ .09 1/2
Sulphur, flour, velvet, brand (carloads)	cwt.	2.15 @
Bergenport (250-pound bbls.)	cwt.	2.10 @
Talc, American	ton	12.00 @ 18.00
French	ton	25.00 @ 35.00
Toluol, pure	gal.	3.50 @
Tripolite earth, powdered	ton	60.00 @
Turpentine, pure gum spirits	gal.	.46 @
wood	gal.	.43 @
Venice	gal.	.11 @ .12
Ultramarine blue	lb.	.15 @ .50
Vermillion, brilliant	lb.	1.00 @ 1.25
Chinese	lb.	.95 @ 1.00
English	lb.	1.50 @ 1.60
Wax, beeswax, white	lb.	.45 @ .60
ceresin, white	lb.	.12 @ .20
carnauba	lb.	.26 @ .45
ozokerite, black	lb.	.60 @
green	lb.	.80 @
montan	lb.	.27 1/2 @ .30
paraffin, refined, 118/120 m. p. (cases)	lb.	.06 1/2 @
123/125 m. p. (cases)	lb.	.07 @
128/130 m. p. (cases)	lb.	.08 @
133/136 m. p. (cases)	lb.	.09 1/2 @ .12
crude, white, 117/119 m. p. (bbils.)	lb.	.05 @
yellow, 124/126 m. p. (bbils.)	lb.	.05 3/4 @
Whiting, Alba	cwt.	.65 @ .85
commercial	cwt.	.75 @ 1.00
gilders	cwt.	.85 @ 1.00
Paris, white, American	cwt.	.95 @ 1.00
English cliffstone	cwt.	1.25 @ 1.50
Wood pulp XXX (carloads)	ton	Nominal
Yellow ochre (Satin)	lb.	.02 1/2 @
india rubber	lb.	1.50 @
Zinc oxide, American process, horsehead brand	lb.	.10 1/2 @
"special"	f. o. b. factory lb.	.10 @
"XX red"	f. o. b. factory lb.	.12 1/2 @
French process, green seal, f. o. b. factory	lb.	.12 1/2 @
red seal, f. o. b. factory	lb.	.13 1/2 @
white seal, f. o. b. factory	lb.	.01 1/4 @
Zinc substitutes	lb.	.15 @
Zinc sulphide, pure	lb.	.15 @

COMPARATIVE NEW YORK PRICES OF RUBBER COMPOUNDING INGREDIENTS—CONTINUED.

FROM AUGUST, 1914, TO AUGUST, 1916.

FILLERS.

	August.	July.	April.	January.	October.	July.	April.	January.	1914.
	Nominal	Nominal	Nominal	Nominal	Nominal	Nominal	Nominal	Nominal	August.
Chalk, English	18 @ 38	18 @ 38	12.50 @ 20.00	11.00 @ 16.00	16.00 @ 24.00	16.00 @ 24.00	14.00 @ 16.00	14.00 @ 16.00	2.75 @ 3.00
French	12 @ 15	12 @ 15	10.00 @ 12.00	8.00 @ 9.00	8.00 @ 9.00	8.00 @ 9.00	8.00 @ 9.00	8.00 @ 9.00	3.10 @ 3.50
Clay, China, imported	80 @ 1.05	80 @ 1.05	80 @ 1.05	80 @ 1.05	80 @ 1.05	80 @ 1.05	80 @ 1.05	80 @ 1.05	14.00 @ 16.00
Fuller's earth, powdered, per 100 lbs.	39.00 @ 35.00	39.00 @ 35.00	39.00 @ 35.00	30.00 @ 35.00	30.00 @ 35.00	30.00 @ 35.00	30.00 @ 35.00	30.00 @ 35.00	8.00 @ 9.00
Magnesite, calcined, powdered ton	1.50 @ 1.70	1.50 @ 1.70	1.50 @ 1.70	1.50 @ 1.70	1.50 @ 1.70	1.50 @ 1.70	1.50 @ 1.70	1.50 @ 1.70	30.00 @ 35.00
Plaster of paris, lb.	3 @ 4	3 @ 4	2 @ 3	2 @ 3	2 @ 3	2 @ 3	1 1/2 @ 2	1 1/2 @ 2	1.50 @ 1.70
Pumic stone, powdered, pure, lb.	2 1/2 @ 4	2 1/2 @ 4	2 1/2 @ 4	2 1/2 @ 4	2 1/2 @ 4	2 1/2 @ 4	2 1/2 @ 4	2 1/2 @ 4	30.00 @ 35.00
Rotten stone, powdered, in barrels	10.00 @ 12.50	10.00 @ 12.50	10.00 @ 12.50	10.00 @ 12.00	10.00 @ 12.00	10.00 @ 12.00	10.00 @ 12.00	10.00 @ 12.00	10.00 @ 12.00
Soapstone, powdered, bags, ton	12.00 @ 40.00	12.00 @ 40.00	12.00 @ 40.00	12.00 @ 40.00	12.00 @ 40.00	12.00 @ 40.00	12.00 @ 40.00	12.00 @ 40.00	12.00 @ 40.00
Silex	9.00 @ 13.00	9.00 @ 13.00	9.00 @ 13.00	9.00 @ 13.00	9.00 @ 13.00	9.00 @ 13.00	15.00 @ 20.00	15.00 @ 20.00	15.00 @ 20.00
Talc, American, ton.	15 @ 22	15 @ 22	5.00 @ 12.00	15.00 @ 20.00	15.00 @ 20.00	15.00 @ 20.00	15.00 @ 25.00	15.00 @ 25.00	15.00 @ 25.00
French	20 @ 35	20 @ 35	18.00 @ 30.00	18.00 @ 30.00	18.00 @ 30.00	18.00 @ 30.00	15.00 @ 25.00	15.00 @ 25.00	15.00 @ 25.00
Italian	70 @ 75	70 @ 75	60 @ 65	50 @ 55	50 @ 55	45 @ 50	45 @ 50	45 @ 50	35.00 @ 40.00
Whiting, commercial	80 @ 85	80 @ 85	70 @ 75	60 @ 65	60 @ 65	55 @ 60	55 @ 60	55 @ 60	35.00 @ 40.00
gilders'	85 @ 90	85 @ 90	75 @ 80	65 @ 70	65 @ 70	55 @ 60	55 @ 60	55 @ 60	15.00 @ 20.00
extra gilders'	85 @ 90	85 @ 90	75 @ 80	65 @ 70	65 @ 70	55 @ 60	55 @ 60	55 @ 60	15.00 @ 20.00
American paris white	1.00 @ 1.50	1.00 @ 1.50	1.00 @ 1.50	75 @ 1.10	75 @ 1.10	75 @ 1.10	75 @ 1.10	75 @ 1.10	15.00 @ 20.00
English cliffstone									35.00 @ 40.00

WAXES.

	August.	July.	April.	January.	October.	July.	April.	January.	1914.
	Nominal	Nominal	Nominal	Nominal	Nominal	Nominal	Nominal	Nominal	August.
Beeswax, white, pure.	40 @ 50	47 @ 55	47 @ 55	47 @ 55	47 @ 55	42 @ 45	40 @ 42	45 @ 55	47 1/2 @ 50
yellow, refined	35 @ 40	36 @ 40	36 @ 40	36 @ 40	35 @ 40	31 @ 35	31 @ 35	30 @ 35	40 @ 41
Carnauba, Bar.	50 @ 52	50 @ 52	50 @ 52	45 @ 47	45 @ 47	45 @ 47	45 @ 47	50 @ 55	50 @ 51
No. 1	43 @ 44	44 @ 45	47 @ 48	38 @ 40	38 @ 40	38 @ 40	45 @ 45	45 @ 45	45 @ 46
No. 2, regular.	38 @ 39	38 @ 40	40 @ 43	33 @ 35	33 @ 35	33 @ 35	40 @ 40	40 @ 45	42 1/2 @ 43
Ceresin, yellow	10 @ 14	10 @ 14	10 @ 14	10 @ 14	10 @ 14	10 @ 14	10 @ 14	10 @ 25	12 @ 22
white	14 @ 16	14 @ 16	14 @ 16	14 @ 16	14 @ 16	15 @ 15	15 @ 15	15 @ 25	14 @ 28
Japan	14 1/2 @ 15	15 @ 16	17 @ 18	13 @ 14	12 1/2 @ 13	11 1/2 @ 12	11 1/2 @ 12	10 1/2 @ 11	11 @ 11 1/2
Montan, crude	28 @ 30	28 @ 30	28 @ 30	28 @ 30	24 @ 26	22 @ 24	16 @ 18	35 @ 40	6 1/2 @ 7 1/2
bleached	45 @ 60	45 @ 60	45 @ 60	28 @ 40	28 @ 40	33 @ 35	28 @ 40	28 @ 40	24 @ 25
Ozokerite, crude, brown.	80 @ 80	80 @ 80	80 @ 80	60 @ 65	60 @ 65	33 @ 35	32 @ 36	32 @ 36	21 @ 25
green	75 @ 80	75 @ 80	75 @ 80	55 @ 65	55 @ 65	30 @ 36	30 @ 36	30 @ 36	25 @ 30
refined, white	60 @ 65	60 @ 65	60 @ 65	40 @ 45	40 @ 45	35 @ 40	35 @ 40	35 @ 40	25 @ 30
refined, yellow									25 @ 30
Paraffin, crude, 193 @ 105 de- grees	4 @ 4 1/2	4 @ 4 1/2	4 @ 4 1/2	3 1/2 @ 4	3 1/2 @ 4	2 1/2 @ 3	2 1/2 @ 3	3 1/2 @ 3 1/2	3 1/2 @ 3 1/2
118 @ 120 degrees	6 1/2 @ 7	6 1/2 @ 7	6 @ 7	3 1/2 @ 4 1/2	4 1/2 @ 5 1/2	4 1/2 @ 5 1/2	4 1/2 @ 5 1/2	4 1/2 @ 5 1/2	4 1/2 @ 5 1/2
refined, domestic, 118 @ 120 degrees	7 1/2 @ 9	7 1/2 @ 9	7 @ 9	4 @ 4 1/2	4 1/2 @ 5 1/2	4 1/2 @ 5 1/2	4 1/2 @ 5 1/2	4 1/2 @ 5 1/2	4 1/2 @ 5 1/2
125 degrees	8 1/2 @ 9	8 1/2 @ 9	8 @ 9	4 1/2 @ 5 1/2	4 1/2 @ 5 1/2	4 1/2 @ 5 1/2	4 1/2 @ 5 1/2	4 1/2 @ 5 1/2	4 1/2 @ 5 1/2
128 degrees	9 1/2 @ 12	9 1/2 @ 12	9 @ 12	6 @ 6 1/2	6 1/2 @ 6 1/2	6 1/2 @ 6 1/2	6 1/2 @ 6 1/2	6 1/2 @ 6 1/2	6 1/2 @ 6 1/2
133 @ 135 degrees									

VEGETABLE OILS.

	August.	July.	April.	January.	October.	July.	April.	January.	1914.
	Nominal	Nominal	Nominal	Nominal	Nominal	Nominal	Nominal	Nominal	August.
Linseed, raw, car lots, gal- lons	72 @ —	63 @ —	76 @ —	66 @ —	55 @ —	51 @ —	58 @ —	48 @ —	59 @ —
boiled, car lots.	73 @ —	64 @ —	77 @ —	67 @ —	56 @ —	55 @ —	59 @ —	50 @ —	60 @ —
refined, car lots.	76 @ —	67 @ —	80 @ —	69 @ —	58 @ —	57 @ —	61 @ —	52 @ —	62 @ —
Cottonseed, yellow, summer, prime	9 1/2 @ 10	10 1/4 @ 10 1/2	10 1/2 @ 11	8.50 @ 8.60	6.91 @ 7.20	6 @ 6 1/4	6 1/2 @ 6 3/4	5 1/4 @ 6	6 1/2 @ 6 3/4
white, summer	9 1/2 @ 10	11 @ 11 1/2	10 1/2 @ 11 1/2	8 1/4 @ 9	— @ —	6 @ 6 1/4	7 @ 7 1/2	6 @ 7	7 @ 7 1/2
Olive, denatured, gallon.	88 @ 90	86 @ 90	95 @ 97	92 @ 94	85 @ 89	86 @ 89	90 @ 95	95 @ 1.10	78 @ 82
foots	9 @ 10	10 @ 10 1/2	13 1/2 @ 14 1/2	9 1/2 @ 10	8 1/2 @ 8 1/4	8 1/2 @ 8 1/4	9 @ 9 1/2	9 1/2 @ 10	7 1/2 @ 7 1/4
Palm, Lagos, spot.	10 @ 10 1/2	11 @ 12	20 @ 22	9 1/2 @ 9 1/2	6 1/2 @ 6 1/2	6 1/2 @ 6 1/2	7 @ 7 1/4	7 @ 7 1/4	7 @ 7 1/4
commercial, spot.	9 1/2 @ 10	10 @ 11	15 @ 16	8 1/2 @ 9	6 1/2 @ 6 1/2	6 1/2 @ 6 1/2	7 @ 7 1/4	6 1/2 @ 7	6 1/2 @ 7
prime, red, spot.	9 1/2 @ 10	10 @ 11	17 @ 18	8 1/2 @ 9	6 1/2 @ 6 1/2	6 1/2 @ 6 1/2	7 @ 7 1/4	6 1/2 @ 7	6 1/2 @ 7
Corn oil, crude, in barrels.	7.75 @ 7.80	8.41 @ 8.51	10.25 @ 10.50	7.85 @ 7.90	6.45 @ 6.55	5.86 @ 5.91	6.26 @ 6.41	5.70 @ 5.75	6.35 @ 6.40
refined, in barrels.	8.91 @ 8.96	10.41 @ 10.46	11.11 @ 11.16	8.45 @ 8.50	7.15 @ 7.20	6.35 @ 6.40	7.25 @ 7.30	— @ —	Nominal
Pine oil, white, steam.	65 @ 70	52 @ 60	50 @ 60	— @ 55	— @ 56	36 @ 38	34 @ 36	34 @ 36	34 @ 38
yellow, steam	40 @ —	30 @ 31	30 @ 31	30 @ 31	30 @ 31	30 @ 31	30 @ 31	30 @ 31	32 @ 35
Tar oil, general distilled.	25 @ —	— @ 30	— @ 30	20 @ 22	20 @ 22	20 @ 22	18 @ 20	18 @ 20	30 @ 31
commercial	— @ 38	— @ 40	— @ 40	— @ 43	— @ 45	— @ 45	— @ 45	— @ 45	— @ 48
2d rectified	— @ 48	— @ 50	— @ 50	— @ 52	— @ 55	— @ 55	— @ 55	— @ 55	— @ 60
3d rectified	— @ 60	— @ 60	— @ 60	— @ 62	— @ 62	— @ 62	— @ 62	— @ 62	— @ 62
4th rectified	— @ 70	— @ 70	— @ 70	— @ 70	— @ 70	— @ 70	— @ 70	— @ 70	— @ 70
Rape seed, in barrels, refined, French	94 @ 96	*1.00 @ 1.05	*1.10 @ 1.15	99 @ 1.00	81 @ 83	80 @ 81	87 @ 89	74 @ 76	74 @ 75
blown	90 @ 92	*95 @ 1.00	*1.05 @ 1.10	96 @ 97	77 @ 79	76 @ 77	85 @ 87	71 @ 73	63 @ —
refined English									59 @ —

MISCELLANEOUS.

Acetone	22 1/2 @ 23	40 @ 42	45 @ 46	35 @ 40	30 @ 33	25 @ 27	21 @ 23	17 @ 20	10 1/2 @ 11 1/2
Ammonia, carbonate, domestic, lb.	11 @ 10 1/2	10 @ 10 1/2	10 @ 10 1/2	8 1/2 @ 9 1/4	8 1/2 @ 9 1/4	8 1/2 @ 9 1/4	8 1/2 @ 9 1/4	8 1/2 @ 9 1/4	8 1/2 @ 9 1/4
powdered	37 @ 45	45 @ 50	60 @ —	95 @ 1.10	95 @ 1.10	1 @ 1.35	1.20 @ —	30 @ 30	10 1/2 @ 11
Aniline oil	36.00 @ 50.00	36.00 @ 50.00	36.00 @ 50.00	36.00 @ 50.00	36.00 @ 50.00	36.00 @ 50.00	36.00 @ 50.00	36.00 @ 50.00	36.00 @ 50.00
Asphaltum, Gilsonite	25.00 @ 50.00	25.00 @ 50.00	25.00 @ 50.00	25.00 @ 50.00	25.00 @ 50.00	25.00 @ 50.00	25.00 @ 50.00	25.00 @ 50.00	25.00 @ 50.00
Manjak	60 @ 65	80 @ 85	60 @ 65	85 @ 90	85 @ 90	60 @ 65	1 @ 1.00	— @ —	— @ —
Benzol, pure, water white, gal. 90 per cent.	68 @ 70	75 @ —	90 @ 1.00	85 @ 90	85 @ 90	60 @ 65	1 @ 1.00	— @ —	— @ —
Beta naphthol, gal.	1.10 @ 1.20	1.35 @ 1.50	1.50 @ 2.00	1.50 @ 3.00	2.00 @ —	2.00 @ —	2.00 @ —	— @ —	— @ —
Burgundy pitch, domestic, foreign	4 1/2 @ 5	4 1/2 @ 5	3 1/2 @ 4	3 @ 5	4 @ 5	4 @ 5	4 @ 5	4 @ 5	4 @ 4 1/2
Carbon, lampblack	7 @ 8	8 1/2 @ 9	6 @ 11	10 @ 12	7 @ 8	7 @ 8	7 @ 8	7 @ 8	6 1/2 @ 8
Chalk, powdered, light, casks, lb.	4 1/2 @ 5 1/4	4 1/2 @ 5 1/4	4 1/2 @ 5 1/4	4 1/2 @ 5 1/4	4 1/2 @ 5 1/4	4 1/2 @ 5 1/4	4 1/2 @ 5 1/4	4 1/2 @ 5 1/4	4 1/2 @ 5 1/4
heavy	4 1/2 @ 5 1/4	4 1/2 @ 5 1/4	4 1/2 @ 5 1/4	4 1/2 @ 5 1/4	4 1/2 @ 5 1/4	4 1/2 @ 5 1/4	4 1/2 @ 5 1/4	4 1/2 @ 5 1/4	4 1/2 @ 5 1/4
Glycerine, C. P., in bulk, lb.	45 @ 46	50 @ 51	57 @ 58	57 @ 58	57 @ 58	57 @ 58	57 @ 58	57 @ 58	57 @ 58
C. P., in cans	46 @ 47	51 @ 52	58 @ 59	58 @ 59	58 @ 59	58 @ 59	58 @ 59	58 @ 59	20 1/2 @ —
Magnesia, calcined	21 @ 22	20 @ 21	14 @ 15	14 @ 15	14 @ 15	14 @ 15	14 @ 15	14 @ 15	14 @ 15
Petroleum, light, light amber	3 1/2 @ 4	3 @ 4	3 @ 4	3 @ 4	3 @ 4	3 @ 4	3 @ 4	3 @ 4	3 @ 3 1/2
Pitch, barrels, 200 pounds. Rosin, common to good, strained, 280 pounds.	4.00 @ —	3.50 @ 4.00	3.50 @ —	3.50 @ —	3.00 @ 3.50	3.00 @ 3.50	3.00 @ 3.50	3.75 @ 4.00	3.75 @ 4.00
Spirits of turpentine, destructive distilled	6.10 @ 6.15	5.20 @ —	5.00 @ —	6.00 @ —	3.65 @ —	3.25 @ —	3.50 @ —	3.70 @ —	4.00 @ 4.10
wood, steam distilled	47 @ —	47 @ —	55 @ —	57 1/2 @ —	41 @ 41 1/2	41 @ 41 1/2	47 @ —	47 1/2 @ 48	47 1/2 @ 48
Starch, corn, pearl, cwt.	38 1/2 @ 39	38 @ —	45 @ —	45 @ —	34 @ —	34 @ —	34 @ —	36 @ —	— @ —
potato, pound	40 1/2 @ 41	40 @ —	51 @ —	52 @ —	39 @ —	39 @ —	41 @ —	42 @ 43	42 @ 43
Sulphur	2.55 @ 2.61	2.25 @ 2.31	2.25 @ 2.36	2.05 @ 2.16	2.15 @ 2.26	2.35 @ 2.46	2.15 @ 2.26	1.99 @ 2.10	2.09 @ 2.20
flour	5 @ 6	5 @ 6 1/2	6 @ 6 1/2	5 1/2 @ 5 1/2	5 1/2 @ 5 1/2	5 1/2 @ 5 1/2	5 1/2 @ 5 1/2	5 1/2 @ 5 1/2	5 1/2 @ 5 1/2
Tar, kiln-burned	2.10 @ 2.50	2.10 @ 2.50	2.10 @ 2.50	2.00 @ 2.40	2.00 @ 2.40	2.00 @ 2.40	2.00 @ 2.40	2.00 @ 2.40	2.00 @ 2.40
retort	7.00 @ —	6.50 @ —	6.00 @ 6.50	6.00 @ 6.50	5.25 @ 5.50	5.00 @ 5.25	5.00 @ 5.25	— @ 6.00	— @ 6.50
Toluol, pure, gal.	7.00 @ —	7.00 @ —	6.00 @ 6.50	6.00 @ 6.50	5.25 @ 5.50	5.25 @ 5.50	5.25 @ 5.50	— @ —	— @ —
90 per cent, gal.	2.50 @ 3.00	4.50 @ 5.00	4.00 @ 4.50	4.75 @ 5.00	4.00 @ 4.50	2.50 @ 3.00	Nominal	— @ —	— @ —
	2.00 @ 2.25	4.00 @ 4.50	4.00 @ 4.50	4.75 @ 5.00	4.00 @ 4.50	2.50 @ 3.00	Nominal	— @ —	— @ —



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Vol. LV. No. 3.

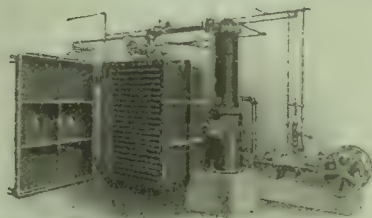
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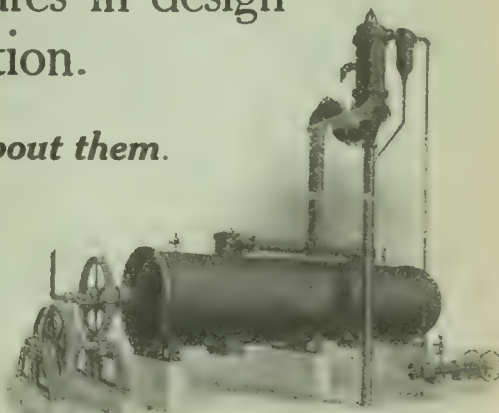


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Published on the 1st of each month by

THE INDIA RUBBER PUBLISHING CO.

No. 25 West 45th Street, New York.

Telephone—Bryant 2576

CABLE ADDRESS: IRWORLD, NEW YORK.

HENRY C. PEARSON, Editor

Vol. 55

DECEMBER 1, 1916

No. 3

SUBSCRIPTIONS: \$3.00 per year, \$1.75 for six months, postpaid, for the United States and dependencies and Mexico. To the Dominion of Canada and all other countries, \$3.50 (or equivalent funds) per year, postpaid.

ADVERTISING: Rates will be made known on application.

REMITTANCES: Should always be made by bank draft or Postoffice or Express money order on New York, payable to THE INDIA RUBBER PUBLISHING COMPANY. Remittances for foreign subscriptions should be sent by International Postal Order, payable as above.

DISCONTINUANCES: Yearly orders for subscriptions and advertising are regarded as permanent, and after the first twelve months they will be discontinued only at the request of the subscriber or advertiser. Bills are rendered promptly at the beginning of each period, and thereby our patrons have due notice of continuance.

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Entered at the New York postoffice as mail matter of the second class.

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A RUBBER SYMPOSIUM.

THE Rubber Club dinner is slated for the evening of January 8. On the afternoon of that day there is to be held at the Waldorf a function that bids fair to rival the banquet in trade interest. It is to be a symposium on the pregnant subject of crude rubber. The dominant note will be a discussion of ways and means for assuring to American manufacturers a continuous and controllable supply of this most vital of raw materials. Experts on the subject of wild and plantation rubber, on ocean transportation and kindred subjects will speak. Discussion of these subjects will be open, not only to members of the Rubber Club, but to visitors who are interested. Cards of admission will be issued to those who apply to the secretary of the club. The committee in charge consists of H. Stuart Hotchkiss, William E. Bruyn, and the Editor of THE INDIA RUBBER WORLD.

THE ADVANCE OF THE AMERICAN CHEMICAL INDUSTRY.

MUCH has been heard of late years about the wonderful accomplishments of German chemists. As an object-lesson it has been beneficial, but, unfortunately, there are pessimists who assume that chemical America is standing still. They agree that America showed the way in electricity, in machinery and machine tools, and to-day stands first in methods of efficiency, but they do not know that the United States bids fair to become the world's chemical leader.

The preliminary statement of the Bureau of the Census for American chemical industries, by five-year periods since 1899, shows that the number of establishments increased from 1,785 to 2,461, and the capital invested, from \$238,471,290 to a total of \$722,988,871 in 1914. The value of the products during these three periods covering 15 years leaped from \$202,506,076 to \$547,801,937, or 170.5 per cent. Correspondingly there was also a gain of 37.5 per cent in persons engaged and of 144.1 per cent in salaries paid.

The war has stimulated the chemical industry tremendously, and the longer it continues the greater will be the growth. Europe, and indeed America, is awakening to the fact that American chemists already mean to American industry what German chemists have meant to German industry. And it can be said truthfully that industrial chemists in the United States are to-day the equal of any in the world. For years every great manufacturing establishment has had a research laboratory where a corps of skilled chemists worked systematically toward wider knowledge, improved methods and higher standards of efficiency in the product. Germany was not unique in this respect; the chief difference has been that we have taken it as a matter of course and failed to give it proper publicity. Another handicap has been the secrecy and isolation attending much of the chemical investigation of the past; the keen commercial rivalry, characteristic of America, has to an unfortunate extent discouraged comparison of results and coördination of research for the common good.

A step in advance was taken, however, when the chemists of the American rubber trade discussed aging tests at their recent meeting in New York. Not specifically as to the subject chosen, but rather because it showed the absolute willingness of those in charge of some of the biggest and best equipped rubber laboratories to discuss questions of general interest fully and frankly. The key-

note was struck by Dr. Geer when he stated that any problem that affected the customer's interest ought to be regarded as a matter that all could and should debate fully. That there are scores of such questions goes without saying, and that their presentation before a congress of alert, practical, working rubber chemists would result in anything other than great general good is incontrovertible. The rubber chemists have made an excellent beginning. They owe it to themselves and to the trade to go on.

GUAYULE IN THE SOUTHWEST.

RUBBER planting in the United States is in sight at last—at least it looks so. The profitable cultivation of guayule, which had its beginnings with the researches of Professor Francis Lloyd, seems assured. This will mean much to the owners of vast tracts of waste land in the South and West. It promises also to bring into use thousands of acres of irrigated lands once fertile but now exhausted as far as ordinary crops go. It will also be of the greatest value to the American rubber trade, an anchor to the windward, and a practical piece of preparedness.

Para rubber once came only from Brazil. Labor conditions, costly freights, and high taxes started the great Para plantations in the Far East. English enterprise, capital and organization did all this. Guayule rubber is or was an exclusive Mexican product. War, confiscation, banditry, are giving an impetus to guayule planting in the United States. Is it not possible that American enterprise, capital and organization will do for the United States what England did for the British Empire, and that rubber may some day be produced on a large scale under the stars and stripes?

TWENTY MILLION TIRES FOR 1917.

A CONSERVATIVE estimate of next season's tire demands indicates a tremendous increase. Motor cars for both business and pleasure are in greater demand than ever. Most manufacturers are everywhere making new sales records, and the increased interest being shown by the agricultural population is particularly significant. The buying power of the 6,000,000 farm owners of the country promises to become an important factor in the sale of moderate priced cars, for while the wheat yield is below normal, other crops are not far from

their best. Indeed, P. J. Calhoun, general sales agent of the Quaker City Rubber Co., who has just returned from the West where he has been compiling statistics regarding the growth of the automobile business, reports that the sale of cars in the Middle West is unprecedented, and that 75 per cent of the cars sold this year has been disposed of in agricultural states. Indiana sales have been double those of 1914; 10,000 cars were sold in Kansas in less than six months. In the three states of Iowa, California and Nebraska the ratio of motor car owners to total population is 1 in 21, 1 in 23, and 1 in 25, respectively; this means that one family in every five or six has a car.

These facts are of great interest as forecasting the probable 1917 tire demand. 1,500,000 new cars will require 6,000,000 tires for original equipment, and as about two-thirds of all motorists carry at least one spare, 1,000,000 more may be counted in. According to the National Automobile Chamber of Commerce 9,000,000 tires were discarded last year. As this represents the tire wear of about 3,400,000 cars, the 1917 replacements on 4,900,000 cars according to the same ratio will reach 12,970,300, which, added to the 7,000,000 already accounted for, makes the colossal grand total of 19,970,300.

THE BRITISH CHEW GUM.

THERE has been in times past a certain polite distress on the part of the cultured European over the American chewing gum habit. To him it was vulgar and offensive, and that it would ever become a British habit, for example, was not to be imagined. Nevertheless, Britons, French and Italians at the front have become devotees of the habit, and civilians are also following their lead. Perhaps it is a pity and perhaps not. Gum chewing is in the abstract no more offensive to non-chewers than is smoking to non-smokers. Moreover, it is a comfort in time of stress, and an aid to digestion. It is affirmed that the Yankee nasal tone has been agreeably modified by this habit. It is also claimed that its effect upon floating aspirates is beneficial. Thus, if a Cockney takes up the habit, instead of dropping an H, the plastic cud holds it firmly in its place, and his English is perfect—so it is said.

RUBBER HAS OFTEN BEEN TERMED A LUXURY. THE sufficient evidence that it is a necessity is found in the fact that less than a month ago Para rubber sold in Berlin at \$22.50 a pound.

Proceedings of the "Rubber Section"—Continued.

Two important addresses delivered before the Rubber Section of the American Chemical Society during the September, 1916, Convention were printed in the October issue, followed by three other interesting papers in the November issue. Below is given a summary of the symposium on "The Accelerated Life Test of Rubber Goods," in which some 20 rubber chemists participated, including Dr. W. C. Geer, C. R. Boggs, D. W. Whipple, J. B. Tuttle, P. L. Wormeley, Dr. L. E. Weber and Messrs. Postmontier, Clark, Barrier, Thompson, Pierce, Kimley, Burns, Potts and Saunders.

DR. L. E. WEBER presided, and in introducing Dr. Geer, stated that he was probably the first man in this country to put an accelerated age test to practical use. He emphasized the paramount importance of aging tests for manufactured goods despite the fact that chemists have been carrying out accelerated tests in various ways and with various results, so that whereas some consider them of inestimable value, others claim that no satisfactory accelerated test has yet been devised.

Dr. Geer then spoke briefly regarding his methods, as follows:

The first work done in the laboratories of The B. F. Goodrich Co. on accelerated age tests was in the fall of 1907, at which time a suggestion came to us from Dr. Van der Linde, of the Gutta Percha & Rubber Co., at Toronto, who used a very fast aging

found the tensile curve of which falls off more rapidly than that of another compound of the same type will deteriorate more slowly on standing over a period of months or years under room conditions. We now have the results of ordinary aging tests plotted in months, in comparison with the accelerated aging tests plotted in days for the same compound, cured under the same conditions, and we find them quite similar in form.

But compounds differ. There are so many factors entering into compounds that a great deal of judgment is required. Several types of tensile curves have been stated.

The method is of no great value in the lower classes of compounds. It is more valuable in the higher classes; for instance, in such types and compounds as fire hose and articles of that kind. It is a service test designed for compounds that are stored as part of their service. The accelerated aging test is not reliable when applied to compounds designed for special purposes and it



W. C. GEER.



D. W. WHIPPLE.



C. R. BOGGS.

test. He performed it upon three small pieces of rubber. The samples to be tested were put in an air bath and heated at about 140 degrees C. for a period of 1, 2 and 3 hours, taken out and examined for cracking, hardening or to ascertain whether it was becoming soft. This method was not parallel with actual aging in any particular and we came to the following: Into an oven, heated air was blown at a temperature of 160 degrees F., the chief care being to add hot fresh air during the desired time. A number of samples 3/32 of an inch in thickness were previously cut and put into this air bath. The air was then started circulating and the test was continued for a period of two weeks, taking out three samples each day. These were allowed to stand for 24 hours until they reached a state of equilibrium, after which they were tested for tensile strength and elongation. The data were plotted in curve form and gave us a time-decay curve of the compound. It is worth while to emphasize the point that we consider this purely a practical, not an ultimate test. It was always run in comparison with a standard compound; that is, at least two sets of samples were tested at the same time. By comparing, then, the curve of a compound the age of which we knew, and the curve of a compound the age of which we did not know, we could tell whether the article would age properly in service.

We have run many thousands of these curves and this method of determining the aging test is reliable, although it undoubtedly can be greatly improved. We find, for instance, that a com-

is very questionable whether it is at all valuable as a specification test to be applied by the consumer. Its primary value lies in the fact that it is an aid to the compounder in the manufacturing plant to permit him to study the aging of compounds the materials of which he knows. It might be used by consumers as mentioned above for compounds such as fire hose where storage under ordinary conditions plays a large part and where it is necessary that the compound be soft and flexible throughout its life.

These remarks I realize are very incomplete, for it has been impossible for me to find time to write a paper on this subject. My primary purpose in speaking before this meeting is to suggest for your earnest consideration the study of accelerated aging tests in order that it may be possible for the rubber manufacturer to give to the consumer compositions of certain age and thus tend to eliminate from the rubber business the perishable features of rubber compounds.

In answer to questions, during the discussion which followed, Dr. Geer stated that his tests were carried out under air conditions and in the dark. His samples were put in a drawer separated by a sheet of cardboard, and the temperatures given were varying to a certain extent, although the temperature of the room did not ordinarily exceed 95 degrees in summer and never became very cold in winter, as there was continuous heat. Thus the aging tests ran parallel with a reasonable varying de-

gree. Although both an under and an over-cured sample can be tested, an under-cured sample, he said, does not pass the test. The temperature of the oven is a factor.

Later, during the discussion relative to insulated wire, particularly in regard to compounds containing a large amount of accelerator, he expressed the opinion that the temperature of an accelerated aging test would make no difference in the physical results obtained. This is limited by reducing the total amount of sulphur when accelerator is used. By "type of compound" he explained that he meant compositions in relation to tensile strength and physical quality. This life test will show whether the product is going to stand up or not. It is a practical service test to accelerate the conditions which the compounds would have in ordinary use, not compounds subjected to very bright light, nor for articles to be subjected to a great deal of steam.

Regarding a suggestion that the permanent elongation of steam hose may be caused by the cold flow of the water which follows the hot injection of steam while exposed to daylight, Dr. Geer said that, bearing in mind that permanent elongation is dependent somewhat upon tensile, it will be found that after three days of elongation the tensile will have fallen off. If the ratio of the tensile and elongation could be worked out it would indicate what the limit ought to be.

C. R. Boggs then discussed a series of experiments begun seven years ago to determine the value of the various short life tests which had been proposed up to that time:

These tests included various dry heat and steam tests and what is known as the acetone peroxide test. On none of the tests tried did we obtain results which were at all promising. Acetone peroxide certainly does not oxidize rubber in the same manner as air does under ordinary conditions. We then imported a quartz tube mercury vapor light in the hope that the ultra-violet light might cause the natural oxidation, but at a greater speed. Oxidation does take place rapidly, but it is similar to that obtained on a sunracking test rather than that obtained by the natural aging of rubber. The ultra-violet light, therefore, might be used as a standard light for a sunracking test, but not for a life test, as the two tests are not similar by any means.

We had had so many disappointments that when we heard of Dr. Geer's heat test we practically refused to try it. Later, however, we did try it and the results were sufficiently promising so that about three or four years ago we made a comparatively thorough study of it. As we have tested samples regularly which have been exposed to the light and air of an ordinary room after regular intervals of time over the entire life of the samples, we knew what the life of our samples should be and consequently it did not take long to find out that the test was very valuable. We have used the test since then. Duplicate samples of those tested by the Geer test, when kept and tested after ordinary deterioration, showed the same characteristics in practically every case. Samples which, by the Geer test, had shown decrease in tensile but not in ultimate elongation, showed the same thing after natural aging. Other samples which maintained their tensile but decreased in elongation, and still others which increased in tensile, all showed the same results by the two tests. The time in days that corresponds with a certain number of hours of the Geer test varies with different grades of compounds, but does not seriously detract from the value of the test.

There are at present many specifications which call for a definite compound of certain chemical and physical characteristics which are based on the assumption that there exists no reliable short life test and that, therefore, the next best insurance is to demand something which has been known to have had a satisfactory life. When the purchaser has taken this position we have assisted him in trying to see that he obtained what he specified. However, if we have a satisfactory short life test in Dr. Geer's heat test, it would be much better for both the purchaser and manufacturer to use this test. The purchaser would be insured of a permanent compound and the manufacturer allowed to use his ingenuity to advance the art of the trade. It is now time for the purchaser to satisfy himself that the test is what it is claimed to be.

Up to the present time, I have not found any samples which were not correctly represented by the Geer test, but I have lately heard of a compound with an organic accelerator which was said to pass the test, but which did not stand up on natural aging. I am now trying to duplicate this result.

Mr. Boggs later expressed himself of the opinion that the

value of the test might increase upon further investigation, adding that most compounds tested by the rapid aging method contained an increased amount of accelerator, and that while successful results are the rule, care must be taken particularly to avoid over-curing.

Mr. Whipple's address carried the discussion a step farther than that of Dr. Geer:

Among the interesting points brought out by Dr. Geer, his discussion of the nature of curves obtained and their interpretation brings to my attention one type of curve which he has omitted, namely, one with an upward tendency from the beginning of the test and not falling below its starting point during the period of the test. Such a curve has been obtained in three instances on tests conducted for Committee D 11. I have not seen the results of the other members of this committee, but if they are in agreement with mine and the curves obtained were to be interpreted in a broad way as indicating service value, it brings out the interesting conclusion that the general run of the code wire is better than the general run of the 30 and 40 per cent grades on the market to-day, as the code wires consistently gave this upward curve.

One test, for instance, showed 102, 106 and 108 per cent, respectively, after 12, 24 and 48 hours' exposure to the test, and at the end of the hours the curve had dropped to its starting point of 100 per cent and did not fall below this after 144 hours, at which time the test was discontinued, whereas three of the 30 per cent wires after 144 hours had fallen to 56, 58 and 58 per cent, respectively.

We have, of course, tried out this aging test on samples of known life, starting with a knowledge of most of the conditions under which the original compounds were made and vulcanized, and although the conditions may not have been exactly the same, the results should have been more nearly comparable, as in the accelerated test the curve was a decreasing one from the beginning and in the actual life test there was a decided increase from the beginning, and at the end of ten years the value was 150 per cent of the original.

Other compounds on which we have a better check have shown in a year and a half an increase from 1,200 to 1,800 pounds tensile strength and at the end of three years were still 1,800 pounds or above, representing an increase to 150 per cent, whereas in the accelerated tests these have shown a downward curve from the beginning.

I am decidedly of the opinion that this accelerated test is of value to the manufacturer in determining the best time and temperature to be used in vulcanizing compounds of the same general type, and I am also of the opinion that it is of great value to the manufacturer in passing judgment on the relative value of many of the ingredients used in rubber compounding, and while not prepared to state any relative values, I am quite sure that after further experiments we shall be able to arrive at an interpretation of results which will be of value to the consumer as well as to the manufacturer.

Referring to Mr. Tuttle's description of tests after which the tensile strength of the articles had fallen down, Mr. Whipple said:

We had some cable made in 1906 which was furnished to the government, and was stored under water at Fort Wadsworth. There were about ten reels, one mile each, and those ten reels continually went down on the electrical test. Now, after nearly ten years, they are entirely defective electrically. The tensile strength of the insulation is over 1,800 pounds and the elongation over 12 inches after ten years. You cannot find an apparent mechanical defect anywhere; they are simply water-logged. This experience is just the opposite of the one mentioned by Mr. Tuttle, but it also shows that both methods of testing must be considered.

P. L. Wormeley then spoke of the work being done at the Bureau of Standards along the lines of Dr. Geer's investigations:

I have been conducting the test which has just been described for something over four years, and would say that in a general way the diagrams which Dr. Geer has put on the board illustrate very well the results obtained at the Bureau of Standards. Our first tests were made with 12 compounds furnished by Dr. Geer and in some cases sufficient time has not elapsed to show their life under normal aging conditions. The results that we have obtained would indicate that the effect of dry heat at 160 degrees F. on the physical properties of rubber compounds is indicative of the probable life; but these results have not exhibited any definite relation between the effect of the heat test and the effect of aging under normal atmospheric conditions. When our tests

have gone a couple of years longer and we can plot the curves, it is possible that some relation can be shown.

Mr. Wormeley also touched upon the effect of under-vulcanization upon the results of the accelerated heat test:

We have had some experience along this line in testing the 12 compounds already referred to as having been furnished by Dr. Geer. Each of these compounds was represented by three cures, one supposed to be the correct cure, one under-vulcanized and one over-vulcanized. In plotting the effect of heat on tensile strength and on elongation, three distinct curves were usually obtained for each compound, the under-vulcanization being represented by the top curve, the correct vulcanization by the middle curve, and the over-vulcanization by the bottom curve. In the case of the lower grade compounds, particularly those containing shoddy, there was not much difference in the effect produced by the different degrees of vulcanization.

J. B. Tuttle followed, emphasizing the desirability of supplementary chemical tests:

All of those who have so far taken part in this discussion have been using mechanical tests, such as tensile strength and elongation, as a measure of the rate of deterioration during aging. For some four or five years, I have been making some tests on the aging of rubber bands, by determining the amount of organic acetone-soluble matter. These tests are still unfinished, but as far as I have gone, the results are significant. Samples having an initial acetone extract of, say, 7 per cent or more, show a rapid increase by the end of the first year. Those with 5 per cent show very little change for a year or two, but increase rapidly after that time. Samples with 4 per cent or less show practically no increase in four years, and I cannot say just now what will happen to them during the next year. As far as their usefulness is concerned, the 7 per cent bands are worthless at the end of a year, and the 5 per cent bands in about three years.

In considering these facts, it occurred to me that if we could duplicate the conditions in a rapid test, then the chemical tests would provide us with an excellent method for checking up the results obtained by means of the mechanical tests. I have made a few attempts along this line, but I have not yet been able to duplicate the causes I have indicated here. It may be that, given the correct temperature and length of time of heating, we would be able to form a fairly accurate estimate of the probable life of the compound.

I tried exposing samples to direct sunlight, and while the results showed some promise, the time required was six weeks or more, and, of course, is out of the question.

So far as heating is concerned, the tests have not shown the degree of difference in behavior of the 4, 5 and 7 per cent compounds that I would like to see, but I believe that if this problem could be satisfactorily worked out, it would be of great value in checking the results obtained by means of the mechanical tests, and thus be more certain that we are getting a good compound.

An especially illuminating instance was cited to emphasize the mistake of placing too much reliance on any one test. Said Mr. Tuttle:

We tested a shipment of rubber gloves intended for the Panama Canal. Every glove was tested and found to be satisfactory, yet within six months of the time after they had been shipped to the Canal, and placed in storage there, they were found to be in a defective condition. Some of these were returned for examination and further test. These gloves stood about 10,000 volts on the break down test, but if you took one of them and simply bent it once, it cracked all the way across. The tests of strength and elongation are the important ones here. The gloves were all right electrically as long as they were not in use.

I have had similar experience with insulated wire. A few days ago I was testing some wire which had been in service only a few years. The electrical properties were satisfactory enough, but the insulation had hardened so that if the wire was bent, the insulation cracked.

The point which I wish to bring out here is this: In making these accelerated life tests, it is not sufficient to rely on one method of testing only; if we are testing rubber insulation, we must make the mechanical tests as well as the electrical tests, and I am not at all certain that the time may not come when we shall add a chemical aging test as well.

Mr. Postmontier's remarks were directed to the possibilities of an accelerated aging test and included valuable suggestions for definite organization of the work:

I am not in a position to make very many experiments of this kind and I suppose that the rubber manufacturing labor-

atories have neither the facilities nor the time; but it has struck me that there is a possibility of a great amount of very important and useful work that could be done by this Rubber Section. There is always a difference between the rubber chemist and the consumer as to the proper specification for rubber materials, and it has occurred to more than one rubber chemist that many times the specifications are drawn to a poorer grade of material or a more expensive grade of material than the consumer might use. On fillers and on rubber content which are called for in different materials, we find a defect in many as to the best materials. The consumer is always after the best material possible, but does not always know how to get it. The majority of rubber manufacturers, being honest, are eager to give the consumer the best material they can; and it seems to me that a coördination of rubber chemists in a section like this can do very good work in determining what are the best materials for the rubber compounds for different purposes. We experiment with a very large amount of compounding material and a large number of different kinds of rubber. It would be almost impossible for any rubber laboratory, even the laboratory of a very large manufacturing concern, to do the necessary work in examining the different features involved. There would always be the element of difference as to the method of tests and liability of result.

There should be a committee appointed by the Rubber Section, first of all, to standardize an accelerator test. It is a very good test—probably no better test can be found—but at the same time there are errors that may be introduced: A faster or a slower current of air; questions as to the uniform temperature, and so on; questions on the heating principle might be brought out. Standardized compounds might be suggested and different laboratories that are willing to enter the work designated to determine the effect of two or three more compounds. Gradually the whole field of different compounds and rubbers could be investigated and a great deal of important work accomplished by this kind of coördination.

E. A. Barrier believes that aging tests are not yet sufficiently conclusive to be of great value to the consumer:

I am quite sure that every consumer arranges to get all of the cooperation he can from the manufacturer; but it seems to me that this aging test is apparently not yet in a position where it will be of very much value to the consumer. It is very evident that there is no definite conclusion as to the normal life of rubber in the aging test. What the consumer wants is a test that he can actually see; and if the sample shows up well in a few days he wants to know that it will last two or three years. In the accelerated aging test a sample may show good results in ten days and the ten-day sample may last a shorter time in service than the three-day sample. It is of value to the manufacturer, but of no value to the consumer. Thirty per cent is a very wide classification and also one that does not directly answer the argument—that these accelerating tests show we have had very little information as to the actual service condition. For instance, this new specification which was discussed this morning confines that to a type. Therefore, the consumer of insulated wire under that specification could use this test, due to the fact that a manufacturer is limited in his specific gravity, and for commercial reasons, he has to bid as low as the next man, and if he follows the specifications he will have the same compound, or practically so.

While not a chemist, Mr. Pierce expressed himself as particularly interested in the subject of accelerated tests and hopeful of an ultimate result. Said he:

The consumer is not primarily interested in how strong the wire is or anything else of that sort which you, as chemists, are always working on, but the consumer is interested in knowing whether that wire is going to be electrically insulated after one or ten years. It occurs to me that if the work on this accelerated test is to be continued and elaborated, it might be profitable to learn whether the insulation shows good electrical properties after this accelerated test, because that is the result you are after. This is done now by chemical tests or mechanical tests, and if it were possible to add to such accelerated tests, tests of electrical properties, the insulation arrived at, etc., the results would mean more to the consumer, and he would be able to grasp it more readily. What the consumer is interested in, in the case of wire, is the question of its electrical properties.

Mr. Kimley then raised a point regarding the aging effect of light:

It occurs to me that perhaps the actual life of rubber is influenced by light conditions. If it were standardized under the

same conditions of light as the articles will be subjected to in actual use, it would disclose a result; for instance, the cover on a hose. On the under side of the hose, the tensile there will deteriorate very slowly while the upper side, against the light and against the building, will deteriorate rapidly, and it must be the condition of light which causes this effect. I think this accelerated age test must be a good thing for the consumer.

Dr. Weber reported that he has found a simple method of accelerated aging highly satisfactory, and described it as follows:

I have carried out in the past five or six years a large number of these accelerated aging tests and while my method of procedure is not the highly scientific one which Dr. Geer has outlined, the results obtained have been so satisfactory that I have come to have great faith in the test.

My method of procedure is to subject the sample in question to a temperature of 65 degrees C. for a period of two weeks. A sample of approximately the same composition and of known aging qualities is subjected to the heat treatment together with the unknown sample. At the end of two weeks the two samples in question are compared and from their relative condition very accurate conclusions regarding the aging properties of the unknown sample can be drawn. It is highly important that the sample of known aging properties have a composition similar to the unknown sample, for it is very readily observed that the higher the rubber content the more violent is the action of the heat.

There are other precautions to be observed if misleading interpretations are to be avoided. If the unknown sample is under-cured, and at the same time contains considerable free sulphur, I have found that unreliable results are obtained. On the other hand, if the sample in question is at all over-cured, the heat treatment shows this up in a very pronounced manner.

I would rather feel that the contradictory results which have been obtained in the accelerated aging test are largely due to the fact that the action of the heat is materially influenced by the nature of the compound and that the latter must be taken into very careful consideration in the interpretation of the results and general conclusions that are drawn. On the other hand, when this factor is taken into careful consideration, very accurate and reliable predictions can be made.

Later, during a discussion regarding free sulphur in vulcanized products, Dr. Weber stated that personally he could see no objection to it in an article properly vulcanized, and he questioned if it were an accepted fact that free sulphur is bad for rubber.

Mr. Potts, in concluding the discussion, made the following important suggestion:

It occurs to me that if we try to get a test to indicate what kind of service the sample will give, a compound which has very little free sulphur will show very little service and the accelerated test will confirm that service. If there be a large amount of free sulphur, then free sulphur in actual service may not have a great effect on the material; but at 65 or 70 degrees, the accelerated test may indicate a shorter service than we actually get in use.

PRODUCTION OF SOAPSTONE AND TALC.

In the production of soapstone the United States ranks first among all countries, and Virginia produces about twenty times as much as the four other producing States—Maryland, North Carolina, Rhode Island and Vermont.

The production of soapstone and talc in the United States is steadily increasing, according to the United States Geological Survey, Department of the Interior. In 1900 it was 27,913 short tons, in 1910 it was 150,716 tons, and in 1915 it was 186,891 short tons.

DUSTLESS LAMPBLACK.

The disagreeable features that invariably attend the use of lampblack or carbon black are plainly evident in the compounding room and around the mixing mills. Pressed lampblack has been used for a long time, but even that is in a more or less powdery condition and only furnishes a partial relief from the flying dust. Carbon black, now used extensively by tire manufacturers, is of a more powdery consistency than lampblack and therefore is subjected to greater pressure, a remedy that is only a partial cure.

Dustless lampblack may be made by mixing 60 per cent of lampblack with 40 per cent of petroleum or palm oil. The resultant compound is a substance that has the consistency of lard or soft butter and may be compounded and milled with perfect cleanliness. The name "Petroblack" is obviously fitting for the former and "Palmoblack" for the latter.

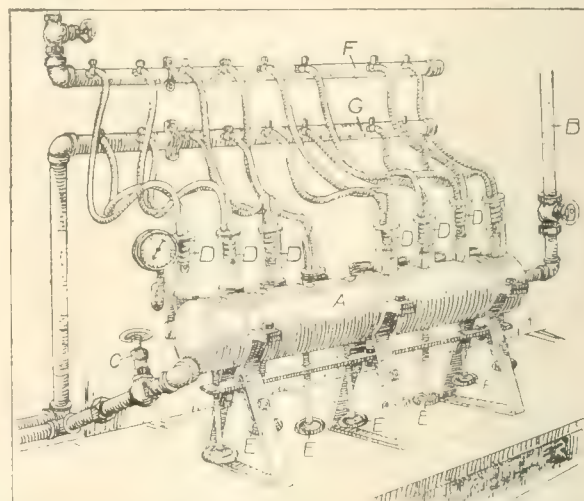
HEATING APPARATUS FOR EXTRACTORS.

D. REPONY, assistant chemist in an important American rubber factory, is the inventor of the interesting apparatus described below.

As a preliminary, it is not necessary to dwell upon troubles attending extraction apparatus heated with open steam. Moreover, while electric plates are clean they are not ideal, as they get out of order easily, the danger of fire is always present and the cost of operating is quite high.

It is claimed that the apparatus illustrated here has taken care of all the objections present in the other types, is simple and cheap to operate and when once installed will last a long time.

It is heated by steam under such conditions that not a trace can escape from the heating casting. This heater is a hollow



A—Heater. B—Steam Inlet. C—Steam Exhaust. D—Extraction Containers. E—Adjusting Screws. F—Water Supply Pipe. G—Waste Pipe.

one-piece brass casting supported by three standards and adapted to be placed on a bench or table. The eight holes to accommodate as many extractors are cored out of the casting at the top, with jackets to prevent direct steam contact. Eight hand screws, supported underneath the heater, are used to raise or lower the extraction containers in the jacketed holes, so that solvents of different boiling points may be run in adjacent containers and the quantitative amount of solvent in circulation regulated. The heater is sufficiently strong so that steam under pressure may be used when it is necessary to use solvents with a high boiling point; however, with solvents up to and including alcohol, the free circulation is sufficient. Steam is admitted at the right end and exhausted through a pipe at the left end of the heater where a steam gage is located to record the pressure.

The extraction containers are common 1½-inch test tubes which fit snugly into the jacketed holes. The condensers are of block tin and the tubes closed by covers of the same metal. Rubber tubing connects the condensers with the water supply and waste pipe, and galvanized cups attached to the frame back of the brass heater afford convenient receptacles in which to place the containers after removal from the heater. This has been found very convenient when extractions are run for a definite time and especially when the removal is left to the night watchman.

What the Rubber Chemists Are Doing.

SYNTHETIC CAOUTCHOUC.

THE researches on the chemical constitution of caoutchouc and the sources and processes available for its synthesis, have been outlined by B. D. W. Luff in the "Journal of the Society of Chemical Industry" (October 16, 1916). The author's paper may be summarized as follows:

Between 1835 and 1840 the study of caoutchouc was undertaken on scientific lines by various investigators, including Dalton, Liebig, Himly, A. Bouchardat, and Gregory, but in all cases their work was more or less disjointed. The most systematic attempt to isolate and examine the various products present in the crude distillate from caoutchouc was made by Greville Williams in 1860. He obtained (1) a liquid boiling at 37 degrees C. to which he gave the name "Isoprene"; (2) a large proportion of a hydrocarbon boiling at 170 to 173 degrees C. which was identical with a body previously obtained by Himly, and called caoutchoucine—this has since been proved to be dipentene; (3) a fraction boiling above 300 degrees C. to which he gave the name "Heveene."

Gustave Bouchardat in 1879 undertook a detailed investigation of isoprene, in the course of which he examined the action of hydrochloric acid; he noted that an additional product was formed, but under certain conditions the action of the acid resulted in the formation of a solid mass, not containing chlorine, but having, in fact, the same percentage composition as isoprene itself. He described this body thus: "It possesses the elasticity and other properties of rubber itself. It is insoluble in alcohol, swells in ether and also in carbon bisulphide, in which it dissolves after the fashion of natural rubber." He also noted that on distillation it yielded the same hydrocarbons as in the case of the natural product. This was an important step in the synthesis of caoutchouc; in fact, in order to make this complete, all that was necessary was to prepare isoprene from elementary materials. At that time the only source of isoprene was rubber itself.

Bouchardat's results were confirmed in 1882 by Tilden who observed the polymerization of isoprene. In discussing isoprene he remarked that one of its chief characteristics was its conversion into true caoutchouc when brought in contact with certain chemical reagents. He pointed out that this was of great practical interest as, if isoprene could be obtained from some other and more accessible source, the synthetical production of rubber could be accomplished. Two years later he succeeded in obtaining isoprene by passing the vapors of turpentine through a hot tube.

The outcome of the work of these two investigators was that the caoutchouc molecule was shown to be formed by the union of a number of molecules of isoprene, and this union or polymerization could be brought about by treating the isoprene with suitable reagents. To them must be given the major share of the credit for laying the foundation of the numerous processes since suggested for preparing synthetic rubber.

In 1887 Wallach observed that isoprene undergoes polymerization on exposure to light with production of a rubber-like mass. In 1892 Tilden showed that the material obtained in this manner could be vulcanized with sulphur. The synthesis of isoprene, and as a corollary, that of caoutchouc, was accomplished by Euler in 1897.

In 1909, owing to the rapid rise in the price of rubber, the problem was taken up in England in a systematic manner by Perkin, Fernbach, Weizmann and Mathews and in Germany by the Bayer and Badische companies. In 1884 Tilden suggested that not only isoprene, but its homologues should be capable of polymerization in a similar manner. This was found to be the case, and these bodies, chief among them butadiene, form the basis of methods for obtaining synthetic caoutchoucs.

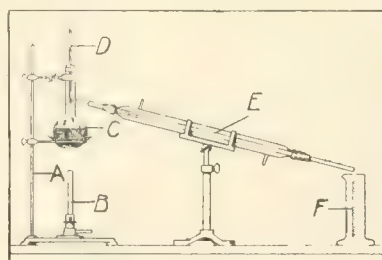
Among the materials available as starting points for suggested syntheses are coal tar; the low-boiling fractions obtained in petroleum distillation; starch and cellulose. On account of the colloidal nature of caoutchouc the question whether or not the synthetic caoutchouc-like bodies can be regarded as true caoutchouc cannot be settled by determining such physical characteristics as would serve to identify a crystalline solid such as camphor.

Harries holds the view that caoutchouc obtained from isoprene with the aid of acetic acid is identical with that occurring in nature. This view is dissented from by Stemmig. The synthetic caoutchouc obtained by polymerization of isoprene in the presence of sodium, however, is not identical with the natural product. In view of the rapid advance in the cultivation of rubber it is generally assumed that unless a synthetic product can be marketed at about 30 cents per pound there is little hope of the natural material being superseded.

METHODS OF ANALYSIS.

TESTING ANILINE OIL.

PURE aniline boils at 360.5 degrees F. and at this temperature 95 per cent of the sample should distil. A common method of testing it is with the apparatus shown in the illustration. It



consists of a ring stand *A* and a piece of wire gauze to support the flask; a Bunsen burner *B*; several 200 cc. Lunge distillation flasks *C*; a thermometer *D*; a funnel for filling the flask; an 18 or 20-inch condenser *E*, and a 100 cc. measuring cylinder *F*.

To make the test, 100 cc. of aniline oil are put into the flask by means of the funnel; the apparatus is assembled as in the illustration, and a flow of water connected from the tap to the condenser. The contents of the flask are gently heated until 360.5 degrees F. is reached, at which temperature it is maintained. The volume of oil collected in the cylinder is the measure of the purity of the aniline.

CHEMICAL PATENTS.

THE UNITED STATES.

VULCANIZING PROCESS. Treating rubber for vulcanization by adding vulcanizing material containing lead and sulphur and a reactive substance comprising a metal and an acid radical adapted to form, with the sulphur and lead, respectively, a light-colored water-insoluble sulphide and a light-colored water-insoluble lead salt and vulcanizing the mixture. [Harold R. Murdock, Naugatuck, Connecticut, assignor to Rubber Regenerating Co., a corporation of Indiana. United States patent No. 95,359 (May 4, 1916).]

PURIFYING ISOPRENE. Isoprene is treated with sulphurous acid in presence of hydrochloric acid which serves to facilitate the formation of a crystallizable sulfoxide for the recovery by heat of the pure hydrocarbon. [F. E. Matthews and E. H. Strange. United States patent No. 1,196,256.]

RUBBER COMPOUND. Rubber, dry cork flour, iron slag and gelatinous rawhide, the quantity of rubber in the compound being less than the combined weights of the other ingredients. [Eugene Von Vargyas, Washington, D. C. United States patent No. 1,202,340.]

AGENT FOR TREATING VULCANIZED RUBBER. As a new agent for the treatment of vulcanized rubber, the solution of vulcanized

gum in a solution of resin in a hydrocarbon. [Harry B. Cox, Bedford Hills, N. Y. Assignor to Herman Goldman, New York, N. Y. United States patent No. 1,202,758.]

RUBBER PRODUCT. A product comprising recovered stock replenished with resin, and a material obtained by dissolving vulcanized gum in rubber resin. [Harry B. Cox, Bedford Hills, N. Y. United States patent No. 1,202,759.]

PROCESS OF RECLAIMING RUBBER. A process of recovering rubber stock from vulcanized rubber which consists in treating it with a resin solution together with a solution of vulcanized gum in a resin solution. [Harry B. Cox, Bedford Hills, N. Y. United States patent No. 1,202,760.]

TREATMENT OF FABRICS USED IN CONJUNCTION WITH VULCANIZED RUBBER. According to this process fabric is treated, previous to its incorporation with rubber, with certain reactive materials, in order to protect it against the disintegrating action of sulphurous and sulphuric acids resulting from vulcanization. The materials mentioned as suitable neutralizers include (1) alkalis, such as sodium carbonate; (2) alkaline or basic salts, such as borax or basic lead carbonate; (3) basic oxides or hydroxides, such as lime, baryta, or barium hydroxide; (4) salts of metallic oxides, such as barium carbonate and zinc acetate. [William Edgar Muntz, London, England, United States patent No. 1,203,241.]

SHOE BOTTOM FILLER. Mixture of rosin, Pontianak, and oil solvent thickened with dextrin to a stiff shoe-bottom filler when cold. [Andrew Thoma, Cambridge, Massachusetts, assignor to North American Chemical Co., New York City. United States patent No. 1,203,435.]

SIZING COMPOSITION. Consisting of rosin soap in which is dissolved approximately one per cent. of rubber material. [Judson A. De Cew, Montreal, Canada. United States patent No. 1,203,857.]

TIRE FILLER. A mixture of paste, plaster of paris, chalk, a perfume, alcohol and bismuth subnitrate. [David G. Elder, Chickamauga, Georgia. United States patent No. 1,203,720.]

VULCANIZATION PROCESS. Consisting in mixing wood creosote, partially vulcanized vegetable oils and rubber compound, and subjecting the whole to a vulcanizing heat. [Augustus O. Bourn, Bristol, Rhode Island. United States patent No. 1,203,966.]

NON-INFLAMMABLE WATERPROOFING COMPOSITION. Consisting of a mixture of rubber cement, spirits of turpentine, paraffin wax, gasoline and tetrachloride of carbon, the physical characteristics of which are that it is non-inflammable and waterproof. [James O. Persons, Norfolk, Virginia. United States patent No. 1,204,056.]

CANADA.

RUBBER PRESERVATIVE. Comprising in combination, cocoa butter, castor oil and gasoline in the proportions of two ounces to two quarts, to one quart, respectively, of the ingredients named. [Samuel T. Smith, Blue Island, Illinois, U. S. A. Canadian patent No. 171,630.]

THE UNITED KINGDOM.

VULCANIZATION BY ULTRA-VIOLET RAYS. [H. P. M. A. Oliver. British patent No. 7,823 (1915).]

SUBSTITUTE FOR RUBBER. Mixture of colophony, caoutchouc, sulphur, naphtha and white lead. [R. Castels. British patent No. 7,703 (1915).]

SWITZERLAND.

REGENERATING RUBBER. Fabric containing rubber is treated with tetrachloroethane, with heating, as a solvent for the rubber. [Compagnie Générale des Caoutchoucs de Térébenthine. Swiss patent No. 72,731 (June 16, 1916).]

SWEDEN.

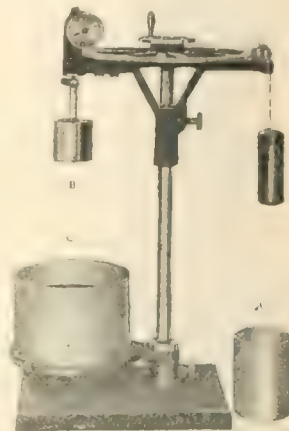
RUBBER SUBSTITUTE. Rubber and egg albumen is molded and cold vulcanized, or after addition of sulphur it is hot vulcanized. [C. Lamberty. Swedish patent No. 40,822 (June 14, 1916).]

LABORATORY APPARATUS.

STORMER VISCOSIMETER.

THE Stormer viscosimeter permits accurate practical work with a small sample of liquid. It is simple in construction; may be quickly and easily cleaned and permits a greater number of tests to be made accurately within a given time than other instruments designed for this purpose. A 50-cc. sample is all that is required for a test.

The instrument is designed upon the principle of rotating a cylinder in the liquid under examination by means of a constant weight and at a known temperature. It consists of a cylinder *B* which may be rotated in a test cup *A*, surrounded by a water or oil bath *C* to maintain the desired temperature. A revolution counter is connected to the spindle supporting the cylinder. The time required for the cylinder to make a specified number of revolutions in distilled water and in the liquid under examination is the measure of the viscosity sought. [Bausch & Lomb Optical Co., Rochester, New York.]



BARNSTEAD AUTOMATIC WATER STILL.

The value of pure distilled water for laboratory and manufacturing operations is universally recognized. The type of automatic still here illustrated and described is heated by gas, steam or electricity and will produce, it is claimed, pure water free of ammonia and all gaseous and organic impurities at a low operating cost. The operation of the still is continuous. The water enters the condenser at the supply pipe and, passing around the condensing tubes, is discharged into an open pipe, allowing the



gases to escape. The water thus purified passes into the still where it is converted into steam, and passing into the condenser is condensed and discharged chemically pure. A continuous stream of water is required for cooling purposes and to supply the boiler that in this particular still is heated by gas. [Eimer & Amend, New York City.]

Guayule Cultivation in the United States.

A RUBBER PREPAREDNESS SUGGESTION.

THERE is a real prospect that the United States may yet become an important rubber producing country. The humid tropical climate essential to the growth of laticiferous rubber bearing trees is lacking, but the silver colored guayule shrub (*Parthenium argentatum*), a member of the aster family, grows wild in many sections of the American Southwest as it does over the central plateau of Mexico. What American enterprise did previous to 1910 in Mexican guayule fields is well known. But the long continued series of revolutions in Mexico reduced the average yearly export of 10,000 tons of guayule rubber to 720 tons in 1914, 2,555 tons in 1915 and 1,408 tons during the 12 months ending June, 1916.

It is not surprising that in 1911 there were 6,000,000 acres of guayule growing wild in Texas alone, because these guayule lands belong to the same belt of which the Chihuahuan desert is a part. This great possibility remained neglected for the most part as long as Mexican export continued, because of the high cost of American labor, but with the supply interrupted and conditions in our sister republic showing scant signs of early improvement, state officials and rubber men turned their attention to it. Experiments in several localities indicated that guayule, in the United States, as in Mexico, responds readily to cultivation, yielding increased growth and greater storage of rubber in its tissues. Not only does it secrete rubber of excellent quality in both root and stem, but its culture involves fewer difficulties than any other commercially important rubber plant, and it thrives best on lean soils in a dry climate. These facts render it so good an investment of the capital needed that the first Arizona plantation of 9,200 acres, to cultivate it on a commercial scale, promises to be the forerunner of many others soon to follow.

Here, indeed, lies an unparalleled opportunity to turn our vast acreage of arid waste lands to profitable use. What this means to the nation is not difficult to compute. The western arid region comprises about two-fifths of the United States;

that is to say, approximately 1,200,000 square miles or 768,000,000 acres. Of this, not less than 500,000,000 acres have a position, altitude and precipitation that would render irrigation very advantageous, yet under the most favorable circumstances only about 45,000,000 acres are capable of irrigation, of which 31,544,000 acres had already had water placed upon them in 1900.

But what of the other 455,000,000 acres not capable of irrigation? These lands are very rich in mineral plant foods. The potassium and phosphorus have not been dissolved and washed away, and they have continuous sunshine during the day. On such lands the guayule often grows wild and may also be cultivated, although it does not mature as rapidly as under irrigation. In this respect its characteristics are peculiar. Although preferring a dry climate and porous, sandy soils, it endures considerable rain. Stimulated by heavy precipitation or regular irrigation it attains a rapid, sturdy growth with large root development, the latter being particularly important because the greater quantity of rubber is secreted in the roots. Thus, the heavier the growth the greater the crop, but, curiously enough, conditions favorable to rapid, heavy growth are unfavorable to a large

secretion of rubber. The ideal routine consists of irrigation for rapid growth to adequate size, followed by six or eight months of drought to promote secretion of rubber in the tissues, the whole covering a period of four years. Irrigation projects for general crops have the objection that the alkalis, such as sodium carbonate, sulphate and chloride, are often abundant in the sub-soil of these western lands, and when placed under irrigation are brought to the surface in solution by capillarity. When the accumulation of evaporated alkalis reaches a certain amount, many crops will no longer thrive, but guayule will. Already consid-



THREE YEAR

TWO YEAR

ONE YEAR

GROWTH OF GUAYULE ON GROUND CUT-OVER.

erable areas have been abandoned in this manner in every state where irrigation has been practiced. Thus the claim of Courtenay De Kalb that in California guayule under irrigation has been known to produce as much as 28 per cent of its net dry weight

in rubber, if his figures can be substantiated, is of great interest. The conservative estimate, by the way, is 8 to 10 per cent.

De Kalb further states that by four-year intensive irrigation methods, 25 tons of dry plant may be grown per acre. On the basis of 8 per cent rubber this would yield 4,000 pounds, worth \$1,520, according to the present low market price of 38 cents per pound. American experience places the average cost of culture, harvesting, extraction and marketing at \$200 an acre annually, or \$800 for the crop. This makes the net income \$720 an acre or \$180 an acre per year. Few crops surpass this on an average of four consecutive years, and what can be grown on arid soil which will approach so high a return? Assuming that 5,000,000 acres of irrigable land, still unutilized, could be devoted to this purpose, the yield would be 10,000,000 tons for the four years, equivalent to 2,500,000 tons annually and worth \$8,500,000,000.

Once more, what of the 455,000,000 acres of arid agricultural land not capable of irrigation? If planted with guayule and properly conserved according to the principles of modern forestry, they would create a great new American industry that would be a source of wealth in time of peace and a protection in case of war. Fifteen years is considered the proper rotation period, as in that time the maximum economic efficiency of the plant is reached at a height of about 16 inches, when it should be removed, not only for the better growth of younger plants, but for the greater efficiency of seeding.

Thus cuttings should be made close to the ground every fifth year. The old practice of pulling plants up by the roots is to be discouraged as it gives no opportunity for new shoots to be sent up during the next growing season.

Assuming 11,200 plants to the acre and each dry plant aver-

aging 1 pound at 15 years, the yield would be 5 tons of shrub per acre, or 896 pounds of rubber on an 8 per cent basis. Were 455,000,000 acres so planted the yield would be 182,000,000 tons every five years, or an average of 36,400,000 tons annually, worth

\$154,700,000,000 at the current price of 38 cents per pound. Thus, the United States is potentially able to provide within its own borders many times its own requirements of crude rubber.

Reviewing the history of guayule extraction the following points are of interest: The natural habitat of the shrub embraces the northern portion of the great central plateau of Mexico, known as the Chihuahuan des-

ert, and a portion of southwestern Texas, an area of nearly 130,000 square miles, of which about 34,000 square miles actually bear guayule. From this source it has been estimated by Endlich that 225,000 tons of shrub had been disposed of up to 1909, which was about half the total supply originally available. The altitude of this region varies from 2,000 to 10,000 feet above sea level, the average being 6,000 feet, for guayule can withstand very low temperatures as well as summer

heat. The records include 5 degrees F. at Marathon, Texas, and 10 degrees F. at Tucson, Arizona. Very little rainfall is necessary, the average throughout this region being around 10 inches annually, although the growth of the plant is in proportion to the precipitation. The plant grows during the rainy season and creates rubber during the dry months, the residual soil moisture, except in rare instances,

being sufficient to sustain life. Maximum growth occurs early in the warm season, when superficial soil water is most plentiful and night and day temperatures are more nearly uniform. The humidity of the region is relatively high, with a somewhat prolonged summer period of high humidity. Dew is frequent during



AVERAGE MINIMUM AND MAXIMUM SEEDLINGS



"Guayule" By Francis E. Hoad.

IRRIGATED PLANT, TWO YEARS OLD, FROM A STOCK

the cooler months, the dew-point always being approached closely at night and frequently passed in winter and during the rainy summer season.

Rarely is wild guayule found growing in the alluvial plains of the Mexican plateau. It prefers gravelly, calcareous soil fit for little else, and so, because of its hardness and easy cultivation, lends itself readily to the agricultural development of our arid Southwest. Propagation is from the seed, and artificial fertilization of the flower is essential in order to insure reliable results. As this requires skill, the plants are started in nurseries under the care of trained horticulturists. When the stalks attain a diameter of one-fourth inch they are transplanted to the field in rows three feet apart, the plants standing 18 inches apart in the row. Although each capitulum produces only a maximum of five seeds, a plant of moderate size will yield many thousands, but the percentage of viable seed does not usually exceed 5 to 25 per cent.

To go into the details of the cultural operations of procuring seed, raising seedlings, transplanting them, caring for the growing plants and harvesting the cultivated guayule would trespass beyond the scope of the present article. These details may be found by those interested in a work on the subject by Professor Francis Ernest Lloyd and published by the Carnegie Institution of Washington. It should be apparent from the foregoing, however, that the possibilities of guayule in the United States are almost unlimited; that its growth might easily become one of our greatest agricultural industries, and that it may thrive in the barren lands of the South as well as in the arid wastes of the Southwest.

REFERENCES.

Important articles devoted to this subject that have appeared in previous issues of THE INDIA RUBBER WORLD include: "The Guayule Rubber Situation," Francis E. Lloyd, Vol. 41, page 115; "The Future of Guayule," Vol. 45, page 20; "The Propagation of Guayule," Francis E. Lloyd, Vol. 45, page 164; "A Guayule Resume," Harold von der Linde, Vol. 45, page 166; "Notes on the Acclimatization and Cultivation of the Guayule," Francis E. Lloyd, Vol. 47, page 1-3, and Vol. 48, page 563; "A Journey Through Guayule Land," Henry C. Pearson, Vol. 35, pages 173 and 205.

TIRE REPAIR VULCANIZERS AND ACCESSORIES IN SOUTH AMERICA.

According to our contemporary "The Automobile," American tire vulcanizers are not adequately represented in South America, where there is a good market for such devices.

In Argentina alone there are 30,000 automobiles, every one of which has tire troubles. Moreover, South American automobilists are not as a rule careful of their tires, and hence the need of frequent repairing. There is a good market for small vulcanizers, such as chauffeurs can use, as well as shop vulcanizers for garages. In Cordoba, Argentina, there is a garage with an up-to-date vulcanizing department, its entire equipment having come from the United States.

Non-skid chains are good sellers in every section of South America, in many cases being included as part of the standard equipment of an automobile. Oversize tires are also in demand and generally on sale. Slip covers, made of rubberized fabric, for automobile seats, are popular and sell well in all South American countries.

JAPANESE LABOR FOR BRAZIL.

That arrangements have been concluded to send 20,000 Japanese to Brazil within two years is the report of the American Vice-Consul at Yokohama, Japan. The negotiations with the Brazilian Government were conducted by a representative of a combine of Japanese emigration companies. A group of 5,000 men will be sent twice a year, in the spring and autumn, and the Brazilian Government will contribute £8 [\$39] toward the transportation expenses of each emigrant.

GUAYAQUIL RUBBER MARKET IN SEPTEMBER.

The rubber market in Guayaquil, Ecuador, was quiet during September, the quotations of \$23.30 for *maromas* (ropes) and \$19.07 for *hojas* (sheets) being the same as for August. Shipments amounted to 15,077 pounds, all going to the United States.

RUBBER TRADE OF COLOMBIA.

The rubber producing industry in Colombia is still in its infancy, but it is growing rapidly, and the production for the year 1915 showed 100 per cent increase over that of the preceding year.

The chief purchasers of Colombian rubber are the United States and Great Britain. Prior to the war Germany was also becoming an important buyer. In 1915 the exports of crude rubber from Colombia to the United States amounted to \$89,348, against \$41,849 the previous year; those to the United Kingdom amounted to \$5,018 in 1914, but fell to only \$2,605 in 1915.

Most of the crude rubber exported from Colombia is obtained from wild *Castilloa* trees, but in the Atrato valley, and also in some other districts, there are rubber trees under cultivation.

RUBBER TRADE IN PANAMA.

The American Consul-General at Panama City, Panama, reports that the exports of crude rubber from his consular district during the year 1915 amounted to 70,604 pounds in quantity and \$18,874 in value, against 142,444 pounds valued at \$10,561 exported during the previous year.

According to the annual report by the American Consul at Colon, Panama, the exports of crude rubber and balata from his district amounted to \$128,794 in 1915, against \$65,859 the previous year.

RUBBER IMPORTS AT HANKOW, CHINA.

The American Consul-General at Hankow, China, reports that imports of rubber and rubber goods through that port in 1915 amounted to \$19,263, compared with \$7,918 during the previous year, showing an increase of \$11,345.

RUBBER TRADE OF SIAM.

The United States Vice-Consul at Bangkok, Siam, reports that imports of American rubber goods into that country during the fiscal year 1915-1916 amounted to \$2,011, against \$378 during the previous fiscal year.

The total exports of crude rubber from Siam during 1915-1916 amounted to \$11,055, against \$15,533 exported during 1914-1915.

RUBBER EXPORTS FROM ZANZIBAR.

Most of the crude rubber exported from Zanzibar is derived from the rubber vine, *Landolphia kirkii*, of which a considerable quantity grows wild in the forests of the Pemba district. Exports for the year 1915 amounted to only 2,384 pounds.

The cultivation of Ceara rubber, which was taken up by the government in 1907, was not successful and has been discontinued.

CRUDE RUBBER EXPORTS FROM CEYLON.

From the "Report of the Ceylon Chamber of Commerce for the Half-Year ended June 30, 1916," just received, it appears that shipments of crude rubber to Great Britain during the period covered showed a decrease of about 3,000,000 pounds, while those to the United States showed an increase of about 7,000,000 pounds compared with the corresponding period of 1915. In fact, the shipments to America were more than double the 1915 January to June totals and amounted to well over 14,000,000 pounds.

RUBBER FOOTWEAR IN LIBYA.

The American consul at Tripoli, Italian North Africa, reports that during the year 1915, \$1,000 worth of American rubber shoes were imported into that colony, against \$850 imported the previous year.

Plantation Rubber in Cochin China—III.

By Lawrence P. Briggs, United States Consul at Saigon, French Indo-China.

QUALITY OF COCHIN CHINA PLANTATION RUBBER.

VARIOUS tests show that Cochin China plantation rubber compares favorably with the similar product of other rubber producing countries. The latex produces the usual percentage of rubber and the purity of the manufactured product is not inferior to that of other rubber.

The comparison of the analysis of the latex of the Soui-giao plantation, made by M. Vernet in the Pasteur Institute at Nhatrang, with tests of Brazil and Ceylon rubber shows that the latex of Cochin China contains a greater proportion of rubber than that of Brazil and slightly less than that of Ceylon:

Constituents.	Soui-giao.	Ceylon.	Brazil.
Rubber	37.91	41.29	31.70
Water	54.38	55.15	56.37
Albuminoids	2.30	2.18	1.90
Residue	3.35	.41	0
Sugar	1.43	.36	0
Resin .....	.62	0	0
Acids .....	.01	0	0
Organic substances	0	0	7.13
Other products	0	0	2.90

The following table shows the results of analyses made at the Michelin factory of the various classes of Soui-giao rubber, compared with fine Para rubber of the Upper Amazon:

	Para.	Smoked.	Natural Coagulation.	Coagulation with Acetic Acid.	Scraps.
Rubber	96.87	94.60	97.02	95.87	94.34
Resins	2.62	4.00	2.44	3.59	1.90
Moisture .....	.32	.68	.15	.18	1.66
Residue .....	.19	.62	.39	.36	2.10

These tables show the physical composition of Cochin China latex and rubber. The actual physical tests of the quality of Ong-Yem rubber sent to the International Rubber Exposition at London in 1911 gave this rubber a rating of 89.5 points out of a possible 100. Tests were also made to determine its tensile strength (*i. e.*, the weight necessary to break a piece of rubber $\frac{1}{4}$ by $\frac{1}{2}$ by 2 inches), its extension (*i. e.*, the length of the above piece, at the moment of breaking), its strain or coefficient of resistance (*i. e.*, the extension produced by half the weight necessary to break it) and its force of tension, or stress (*i. e.*, its coefficient of rupture per square inch). These tests show the following comparison between the Ong-Yem product and fine hard Para rubber.

	Tensile Strength.	Extension.	Strain.	Stress.
Para	59.4 pounds	9 $\frac{3}{4}$ in.	4 $\frac{7}{8}$ in.	440 pounds
Ong-Yem	55 pounds	8 $\frac{1}{2}$ in.	4 $\frac{1}{16}$ in.	475.2 pounds

Cochin China rubber received honorable mention at the Singapore Exposition (1910), a diploma of honor at the London Exposition (1911), a Grand Prize at the Ghent Exposition (1913) and a diploma of honor, two silver medal diplomas, two silver medals and a gold medal at the London Exposition (1914). It is only necessary to add that it receives the highest prices in the rubber market of Paris.

INSTALLATION: COST OF PRODUCTION.

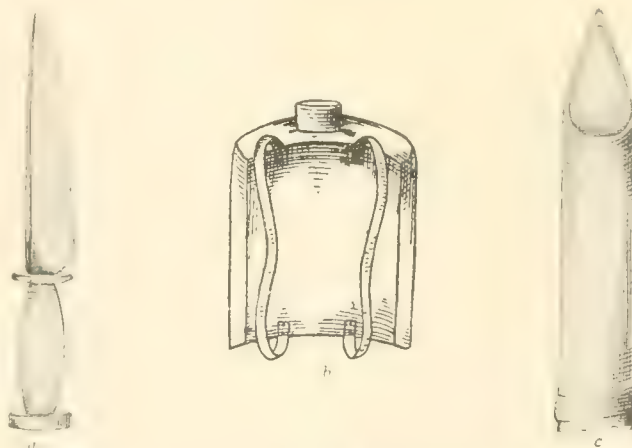
The installation used in the preparation of the rubber varies from a shed containing a set of rollers and some drying space to a fine, large building and the latest modern equipment such as are found on the plantations of Xatrach and Suzannah. The smaller plantations prepare the product with no equipment except a single roller, while the natives roll it into a mass like wild rubber; but the larger plantations are equipped to make the best quality of smoked sheets of crêpe. The Belland estates, which until 1913 produced nearly all the rubber exported from Saigon, now make only crêpe and scrap rubber, while Xatrach plantation, which during the past two years has been the most productive, turns out various grades of rubber in the following proportions: $\frac{2}{3}$ smoked sheets, $\frac{1}{3}$ crêpe, Nos. 1, 2, 3 and 4.

Cost of production has, up to the present time, been such a variable quantity that it is very difficult to say anything about it. Only one plantation or group of plantations—the Belland Estates—has approached its limit of production. The Xatrach plantation is the most productive at present, but its trees are young and some experts are of the opinion that the installation and initial expense was too great for the size of the estate. It is estimated that, when the larger plantations are fully developed, the cost of production will be about 50 cents (United States currency) per kilo—a figure somewhat below that of the neighboring countries of the Far East. None of the plantations have ever been able to produce at this figure, except, perhaps, the Belland Estates, which have practically no installation except crêpe rollers.

THE LABOR PROBLEM.

One of the chief factors of cost of production is labor. The laborers on the rubber plantations of Cochin China are nearly all Annamites or Mois. The cost of coolie hand-labor is about 15 to 20 cents (United States currency) per day for men, and 10 to 15 cents for women, with or without rice. The Annamite is industrious, apt and fairly efficient, but slow. The Mois—a semi-savage tribe—are inferior to the Annamites. The Locninh plantation has imported about 600 Javanese coolies. Their slight superiority to the Annamite may be due entirely to their previous training in this kind of work.

The region directly tributary to the port of Saigon—Cochin China, Cambodia and southern Annam—is not overpopulated. This region comprises more than 100,000 square miles and has a population not much above 5,000,000. It is a very rich country. The exports from the port of Saigon generally amount to about \$40,000,000 per year—more than 70 per cent of the entire export of French Indo-China, although this region has less than one-third of the total population. This exportation is almost entirely of agricultural products—mainly rice, Saigon generally ranking second to Rangoon among the ports of the world in the exportation of this product. During rice-harvest the labor question is sometimes an anxious one, and this will be increasingly true as



NATIVE DEVICES FOR TAPPING AND COLLECTING LATEX.

a—Tapping knife (coupe coupe). b—Knapsack can for collecting latex. c—Cup from joint of bamboo for receiving latex.

the agricultural resources of the country develop. Rice-harvest, fortunately, comes during the dry season when there is least demand for labor on the rubber plantations. Various attempts have been made to transplant coolie labor from the overpopulated districts of Tonkin, where the laborer is more skilful and more industrious and receives smaller wages. This may prove to be the future solution of this problem if it should ever become a serious one. There are many Chinese coolies in Saigon and Cholon, although none has yet been employed on the rubber plantations. Chinese labor is generally slightly more expensive but considerably more efficient than Annamite labor, and there would be no difficulty in inducing Chinese coolies to come in sufficient numbers to supply any demand of the labor market; but Chinese laborers are more independent, and it is quite likely that the French government would object to any considerable influx of Chinese coolie laborers into Cochin China.

The question of health-condition is not a serious one among the coolies of Cochin China. There is always some cholera and often bubonic and pneumonic plague among the natives, and it is thought that the red soil of the rubber plantation is conducive to a peculiar native disease, which the French call "*fièvre du bois*" (fever of the woods); but there has never been a serious epidemic of any kind on any of the rubber plantations. Famines are unknown in Cochin China. Since the beginning of the rubber industry here, the annual exportation of rice from the port of Saigon has never fallen below 600,000 tons. Almost every year Cochin China is called upon to relieve the sufferings caused by drought or flood in Tonkin.

TRANSPORTATION.

After the rubber is prepared, there remains the question of its transportation to Saigon. Some of the older plantations; *e. g.*, the Belland Estates, are within sight of the city; but the newer plantations in the red soil district are more distant. The plantations of Suzannah, Xuan-loc and several others in the province of Bienhoa are located 45 or 50 miles from Saigon, out near the railway running to Nhatrang, while the Xatrach Locninh and other important plantations of the province of Thudaumot are 65 to 75 miles from Saigon by automobile. However, the roads are level and good and the high value of rubber combined with its small bulk makes transportation a question of relatively small importance. The construction of railways and automobile roads through the rubber district offers no serious difficulties, and the development of transportation facilities is sure to keep pace with the settlement of the country. Then, too, Cochin China has a wonderful system of water transportation. None of the rubber plantations are very distant from a stream or canal by which rubber can be cheaply transported by *sampan* to Saigon.

Saigon is the most important French seaport outside of France and is accessible to vessels of any draught. It has regular freight connections with the mother-country as well as with Singapore and Hongkong and frequent service to Manila, Bangkok and other neighboring ports.

PRODUCTION AND EXPORTATION.

The production of rubber in the Saigon district, since its beginning in 1908, has been about as follows in kilograms per plantation:

	1908.	1909.	1910.	1911.
Belland estates...kilos	1,500	3,000	5,000	10,000
Suoi-giao	1,749	2,573	2,086	3,080
Xatrach	...	...	...	120
Suzannah	...	...	...	...
Others	200	200	300	300
Totals	3,449	5,773	7,386	13,500
	1912.	1913.	1914.	1915.
Belland estates...kilos	12,000	18,000	26,000	28,000
Suoi-giao	3,800	3,527	5,319	14,783
Xatrach	1,870	25,170	77,000	128,616
Suzannah	4,480	24,129	47,242	95,776
Others	2,000	14,174	29,439	79,995
Totals	24,150	85,000	185,000	347,170

The exportation of rubber from the port of Saigon during the same period, by weight and value, has been as follows:

	United States			United States	
	Kilograms.	Currency.		Kilograms.	Currency.
1908.....	3,021	\$3,797	1912.....	25,563	\$22,201
1909.....	5,729	4,976	1913.....	85,000	73,823
1910.....	6,379	5,540	1914.....	175,067	152,046
1911.....	13,577	11,792	1915.....	357,003	310,057

These figures represent the customs values, which since 1908 amount to 450 francs (nearly \$90 United States currency) per 100 kilos. At present this is much below the market value. The actual selling price during the year 1915 began with 620 francs January 1, reached 767 francs early in July, which was high-water mark until late in October, when it rose to 1,073, fell again to 911 during the latter part of November and finished the year at 1,223. Taking 850 francs as an average price for the year, the amount of money received by the plantation owners for the 1915 product was nearly \$600,000 (United States currency). Since January 1, 1916, the price has gradually declined to about 1,100 francs per 100 kilograms. If this price is maintained the market value of the 1916 product will be about \$1,650,000.

Practically all this rubber has been exported to France. The war at first interfered with this exportation, and during the latter part of 1914 some of the leading producers were seeking a market elsewhere; but early in 1915 the French Government forbade the exportation of this product to any country except France, and Saigon rubber soon began to find a good market in the mother-country. The price soon began to rise, as shown in the preceding paragraph.

PRESENT STATUS OF PLANTATION RUBBER.

Enough has already been said to show that the production of plantation rubber is no longer an experiment in Cochin China. A few figures will show its present status and future prospects.

Status of the rubber plantations January 1, 1916.

PROVINCE OF BARIA.

Plantation.	Director.	Hectares in Plantation.	Hectares Planted.	Number of Trees.	Number Tapped.
Société des Plantations de Courtenay	M. Sipiery	4,070	1,000	150,151	0
Long-hiep	Bonnefoy Freres..	1,100	200	70,000	4,000
Long-xuyen		5,019	310	97,518	0
Others					
Totals		10,189	1,510	317,669	4,000

PROVINCE OF BIENHOA.

Plantation.	Director.	Hectares in Plantation.	Hectares Planted.	Number of Trees.	Number Tapped.
Ste. Agricole de Suzannah	M. Girard	3,400	872	300,000	100,000
Ste. des plantations d'Heveas de Xuan-loc.	M. Luya	2,363	738	208,000	0
Ste. des P. d'Anloc.	M. Girard	3,300	798	200,000	0
Ste. de P. de Caoutchouc de Cochinchine.	M. Ferandy	2,472	730	187,500	0
Ste. Agricole de Thanh-tuy-ha	M. Desbordes	3,046	500	115,000	0
Ste. des P. de Tan-loc.	M. de la Souchere.	1,000	360	110,000	0
Others		13,713	1,577	426,000	24,000
Totals		29,294	5,575	1,546,500	134,000

PROVINCE OF GIADINH.

Plantation.	Director.	Hectares in Plantation.	Hectares Planted.	Number of Trees.	Number Tapped.
Ste. Nouvelle des P. d'Heveas de Tan-thanh-dong	M. Guery	600	550	220,000	50,000
Ass'n Agricole de Tan-ninh	D. Jessula	400	400	120,000	0
Vinh-cu	M. Guyonnet	400	400	120,000	0
Vinh-phuoc	M. F. Filhol	412	365	102,000	15,000
Belland plantations	M. Chesnay	80	80	25,000	13,300
Others		2,349	1,610	684,648	0
Totals		4,241	3,405	1,271,648	78,300

PROVINCE OF TAYNINH.

Plantation.	Director.	Hectares in Plantation.	Hectares Planted.	Number of Trees.	Number Tapped.
Ste. des Heveas de Tay-ninh	D. Jessula	2,160	1,277	403,000	15,000
Others		1,584	225	62,000	0
Totals		3,744	1,502	465,000	15,000

PROVINCE OF THUDAUMOT.

Plantation.	Director.	Hectares in Plantation.	Hectares Planted.	Number of Trees.	Number Tapped.
Ste. des C. de l'Indochine (Locninh)	M. Ectors	10,300	2,238	623,901	2,000
Ste. de P. d'Heveas de Xatrach	M. Jacque	1,100	600	220,000	160,000
Plantations Hallet:					
Xa-cam	M. Haffner	1,000	620	183,420	0
An loc	M. Haffner	1,000	454	135,890	0
Others		4,500	625	157,252	6,700
Totals		17,900	4,541	1,320,463	168,700

ISLAND OF PHU-QUOC.

Plantation.	Director.	Hectares in Plantation.	Hectares Planted.	Number of Trees.	Number Tapped.
Société d'Exploitation de Phu-Quoc.	M. Lagrand	2,684	250	100,000	1,200

PROTECTORATE OF CAMBODIA.

Plantation.	Director.	Hectares in Plantation.	Hectares Planted.	Number of Trees.	Number Tapped.
Plantation de Kep-plage	M. Dupuy	32	18	6,400	0

PROTECTORATE OF ANNAM					
Dak Lapan	M. Dehenon, Ounh-n Dr. Yersin, Nhatrang				
Riviere Verte		3,000	425	100,000	0
Others		150	150	60,000	13,523
Totals		3,650	673	203,000	13,523

RECAPITULATION.					
Colony of Cochin-China					
Province of Baria	10,189	1,510	317,669	4,000	
Province of Bienhoa	29,294	5,575	1,546,500	134,000	
Province of Cochinchine	4,441	3,405	1,271,648	78,300	
Province of Tay Ninh	3,744	1,502	465,000	15,000	
Province of Thudamot	17,000	4,541	1,320,403	168,700	
Island of Phu-Quoc	2,684	36	100,000	1,200	
Totals	68,052	16,393	5,021,330	401,200	
Protectorate of Cambodia	30	18	6,400	0	
Protectorate of Annam	3,650	673	203,000	13,523	
Totals	71,784	17,084	5,230,730	414,723	

PROSPECTIVE DEVELOPMENT, 1916-1920.

The following tables show the number of trees to be tapped during each of the years 1916-1920, inclusive. The increase in production will undoubtedly be relatively greater than the increase in the number of trees to be tapped, for, with each successive year after the present, the average age of the trees tapped will be progressively greater. In 1920 the annual production should amount to more than 1 kilo per tree, or a total of over 5,000 metric tons.

PROVINCE OF BARIA.

Plantation.	Trees to Be Tapped.				
	1916.	1917.	1918.	1919.	1920.
Courtenay	8,000	30,000	60,000	150,000	150,000
Long-hiep	1,000	24,000	44,000	78,000	80,000
Long-xuyen	1,000	22,500	25,627	81,914	131,075
Others					
Totals	11,000	76,500	129,627	309,914	361,075

PROVINCE OF BIENHOA.

	1916.	1917.	1918.	1919.	1920.
Suzannal	115,000	300,000	300,000	300,000	300,000
An-loc	75,000	140,000	150,000	200,000	200,000
Xuan-loc	26,000	40,000	60,000	80,000	110,000
Cochinchine	18,000	60,000	120,000	177,500	197,200
Thudamot	10,000	30,000	80,000	100,000	115,000
Tay Ninh	65,000	110,000	110,000	110,000	275,000
Others	34,000	65,000	108,000	150,000	236,000
Totals	343,000	745,000	928,000	1,117,500	1,433,200

PROVINCE OF GIADINH.

	1916.	1917.	1918.	1919.	1920.
Tan-thanh-dong ..	30,000	150,000	200,000	220,000	220,000
Tay Ninh	40,000	40,000	80,000	100,000	100,000
Vinh	25,000	70,000	70,000	100,000	100,000
Vinh	23,000	23,000	23,000	23,000	23,000
Bel	25,000	25,000	25,000	25,000	25,000
Others	26,700	122,300	285,066	420,442	635,524
Totals	196,700	430,300	683,066	888,442	1,103,524

PROVINCE OF TAYNINH.

	1916.	1917.	1918.	1919.	1920.
Tay Ninh	60,000	200,000	400,000	400,000	400,000
Others	0	5,000	26,000	40,000	46,000
Totals	60,000	205,000	426,000	440,000	446,000

PROVINCE OF THUDAMOT.

	1916.	1917.	1918.	1919.	1920.
Leone	47,995	242,745	487,553	597,659	620,000
Xat	100,000	200,000	200,000	250,000	250,000
Xa	0	0	0	0	183,420
An	0	0	0	0	135,890
Other	9,000	19,620	22,278	31,988	130,400
Totals	216,995	462,365	709,831	879,647	1,328,807

ISLAND OF PHU-QUOC.

	1916.	1917.	1918.	1919.	1920.
Phu-Quoc	5,500	18,000	44,000	80,000	100,000

PROTECTORATE OF CAMBODIA.

	1916.	1917.	1918.	1919.	1920.
M. D	800	2,800	6,400	6,400	6,400

PROTECTORATE OF ANNAM.

	1916.	1917.	1918.	1919.	1920.
Dak Lapan	0	0	0	60,000	100,000
Riviere Verte	0	0	0	50,000	60,000
Suoi-giao	16,000	20,000	30,000	50,000	60,000
Others	0	4,000	20,000	22,000	43,000
Totals	16,000	34,000	75,000	132,000	203,000

RECAPITULATION.

Plantation.	Trees to Be Tapped.				
	1916.	1917.	1918.	1919.	1920.
Colony of Cochin-China					
Province of Baria	21,000	76,500	129,627	309,914	361,075
Province of Bienhoa	343,000	745,000	928,000	1,117,500	1,433,200
Province of Cochinchine	196,700	430,300	683,066	888,442	1,103,524
Province of Tay Ninh	60,000	205,000	426,000	440,000	446,000

Prov. of Thudamot	216,995	462,365	709,831	879,647	1,328,807
Island of Phu-quoc	5,500	18,000	44,000	80,000	100,000
Totals	843,195	1,937,165	2,920,524	3,715,503	4,772,606
Protectorate of Cambodia	800	2,800	6,400	6,400	6,400
Protectorate of Annam	16,000	34,000	75,000	132,000	203,000
Totals	859,995	1,973,965	3,001,924	3,823,903	4,982,006

FUTURE OF PLANTATION RUBBER.

The above calculation takes into consideration only the exploitation of the trees now planted, minus a certain allowance for thinning out. It is well to remember that only about 17,000 hectares are now planted. The full exploitation of the lands now in plantation would increase this amount to over 70,000 hectares, and this amount could easily be doubled. Then as the trees grow older, the production per hectare will at least double, even with a reasonable allowance for thinning out. So the ultimate maximum of rubber production in Cochin China cannot be placed below 80,000 to 100,000 metric tons per year, with an annual market value of at least \$100,000,000.

SOURCES OF RUBBER STATISTICS.

The "Association des Planteurs de Caoutchouc de l'Indochine" issues a small publication of about 100 pages, which is mailed to foreign countries for 10 francs per year. This was originally a monthly publication, but it has recently been appearing only once in two or three months. Occasionally a special statistical number appears. The statistics of this report are obtained largely from the October-December, 1915, number (No. 49) and the special London 1914 and Taiwan 1916 numbers.

The monthly "Bulletin de la Chambre d'Agriculture de la Cochinchine," which now appears every two months, sometimes contains information concerning rubber conditions in Cochin China. This publication is about the size of the "Annales" referred to above. The subscription price to foreign countries is 12 francs per year. The "Bulletin Economique de l'Indochine," a semi-official economic review appearing six times a year, often contains valuable articles on rubber and other industries. It is published by l'Imprimerie d'Extreme-Orient, Hanoi, and mailed to foreign countries for 22 francs per year.

The "Bulletin Financier de l'Indochine" is a weekly paper published in Saigon at 25 francs a year for foreign countries. It contains current economic news and articles and is the chief advertising medium for rubber shares and other property. The decrees of the government of France and of Indo-China relating to rubber and other lands are published in the "Bulletin Administratif de la Cochinchine," which appears every week and will be sent to foreign countries for 20 francs a year, or about 20 cents (United States currency) for a single number. The land regulations quoted in this report are found in the numbers for January 22, 1914, and February 11, 1915.

Several pamphlets have been published on rubber production in Cochin China. Those consulted in the preparation of this report were: P. Morange, "Le Caoutchouc de Plantation en Cochinchine" (F. H. Schneider, Saigon, 1911); J. Lan, "Notice on the Hevea Brasiliensis in Cochin China" (F. H. Schneider, Saigon, 1911), and F. Ripeau, "Caoutchoucs Amazoniens et Asiatiques" (Emile Larose, Paris, 1914).

The export statistics of this report are based on the figures of the customs authorities of the port of Saigon. They are not always exact. Until 1913 no distinction was made between wild and plantation rubber, and the division given in this report is an estimate based largely on statistics of production. Exportation does not always agree with production. For instance, the oldest productive plantation—that of Suoi-giao—sometimes exports its product from Saigon, sometimes from Nhatrang and sometimes from Camranh.

Finally, much of the material of this report has been obtained by the knowledge of conditions gained by a two years' residence in Cochin China, by an extensive correspondence with the leading rubber producers of this colony and by personal observation during visits to the leading plantations.

Foreign Import Duties on Boots and Shoes.

THE following table, corrected to November 20, 1916, shows the foreign import duties on rubber boots and shoes of all descriptions, imported into the various countries from the United States.

Owing to the frequency of tariff changes the figures and information given in this table should be periodically verified. It is also advised that small trial shipments be made in order to

test the rates prior to sending more extensive shipments.

In the first column is given the country, while the next column contains the articles with notes regarding surtaxes, basis of rates, etc. The third column specifies whether the weight is to be taken as gross or net and the last column gives the ad valorem duty or the rate of specific duty in United States currency.

Countries.	Articles and Remarks.	Weight.	Duty (U. S. Currency).
EUROPE:			
Austria-Hungary	Shoemakers' wares with textile goods, per 100 pounds.	Net	\$11.05
Belgium	Manufactures of india rubber, ad valorem.	Net	10%
Bulgaria	Ordinary rubber boots and shoes (galoshes), per 100 pounds (includes 20 per cent surtax).	Net	\$10.51
	Other rubber boots and shoes, per 100 pounds (includes 20 per cent surtax).	Net	21.01
Denmark	Rubber boots and shoes, with textiles, per 100 pounds—including inner packing.	...	6.08
France	Rubber footwear lined with felt, wool, or any partly woolen cloth, per 100 pounds.	Net	13.13
	Rubber footwear lined with cotton, hemp, or flax cloth, per 100 pounds.	Net	10.51
	Footwear with soles of rubber, net part.	...	0.14
Germany	Footwear, with or without rubber soles. Unvarnished, per 100 pounds.	Net	7.56
	Varnished, per 100 pounds.	Net	8.64
Great Britain	Manufactures of rubber.	...	Free
Greece	Galoshes of rubber, per 100 pounds.	Net	\$30.73
Italy	Rubber footwear, lined or unlined with stuff, per 100 pairs.	...	24.13
	Other rubber footwear, per 100 pounds.	Net	4.38
Netherlands	Rubber footwear, ad valorem.	Net	5%
Norway	Rubber footwear, per 100 pounds.	Net	\$12.16
Portugal	Rubber footwear, per 100 pounds.	Net	19.22
Roumania	Rubber footwear, per 100 pounds.	Legal	10.51
Russia	Rubber footwear, per 100 pounds.	Net	\$26.35
Servia	Rubber footwear, per 100 pounds.	Net	12.26
Spain	Rubber footwear, per 100 pounds.	Net	26.26
Sweden	Rubber footwear, per 100 pounds.	Net	14.36
Switzerland	Rubber footwear, per 100 pounds.	Gross	2.63
Turkey	Rubber galoshes, boots and shoes.	Net	10.50
NORTH AMERICA:			
Canada and Nova Scotia	Rubber boots and shoes, ad valorem, including war tax 7.5%.	...	32.24
	Imports of articles invoiced at prices less than the market value in the country from which exported, are liable to a "dumping" duty if such articles are also made in Canada.		
Newfoundland	Footwear and all manufactures in part or in whole of india rubber or gutta percha, ad valorem, including 10 per cent surtax.	...	44%
CENTRAL AMERICA:			
Costa Rica	Rubber footwear, per 100 pounds.	Gross	\$21.09
Guatemala	Boots and shoes, and overshoes of rubber or rubberized cloth, per 100 pounds.	Legal	46.49
Honduras	Rubber boots, per 100 pounds.	Gross	65.44
	Footwear of rubberized cloth, per 100 pounds.	Gross	21.81
Nicaragua	Footwear of rubber such as waterproof boots and shoes, per 100 pounds.	Gross	4.50
Panama	Rubber footwear, ad valorem.	...	15%
Salvador	Rubber footwear, per 100 pounds.	Gross	\$46.14
WEST INDIES:			
Cuba	Rubber footwear with cotton fabric, per 100 pounds.	Legal	11.82
Saint Domingo	Rubber footwear.	Net	11.35
SOUTH AMERICA:			
Argentina	Rubber footwear—includes surtax of 2%—duty based on valuation of \$54.72 per 100 pounds.	Legal	42%
	Footwear of cloth and rubber, including galoshes, boots, shoes, etc., duty based on valuation of \$2.90 per dozen, includes surtax of 2 per cent of valuation.	...	42%
	Same footwear, larger sizes, duty based on valuation of \$6.76 per dozen, includes surtax of 2 per cent of valuation.	...	42%
Bolivia	Rubber footwear for men, surtax of 15 per cent is included, based on valuation of \$14.00 per dozen pairs.	...	51.75%
	Rubber footwear for women and children, surtax of 15 per cent, based on valuation of \$0.56 per pound.	Legal	46%
	Footwear for women and children with exterior lining with or without interior lining, including surtax of 15 per cent, based on valuation of \$0.88 per pound.	Legal	46%
Brazil	Rubber footwear—nominally 3 millers per kilo—per 100 pounds.	Legal	\$52.85
Chile	Rubber footwear of all kinds, per 100 pounds.	Net	33.11
Ecuador	Rubber footwear, including surtax of 125.5 per cent, per 100 pounds.	Net	29.87
Paraguay	Rubber footwear, with sole measuring 25 centimeters or less, includes surtax of 1½ per cent of valuation, based on valuation of \$5.79 per dozen pairs.	...	63.5%
	Rubber footwear of larger sizes, based on valuation of \$10.00 per dozen pairs.	...	63.5%
Peru	Rubber footwear, including surtax of 10 per cent, based on valuation of \$32.76 per dozen pairs.	Legal	\$32.76
	At other ports—surtax of 8 per cent, per 100 pounds.	Legal	32.18
Uruguay	Rubber footwear, based on valuation of \$5.17 per dozen pairs—surtax of 14 per cent of valuation.	...	62%
Venezuela	Rubber footwear, including surtax of 56.55 per cent, per 100 pounds.	Gross	\$ 4.40
ASIA:			
China	Rubber boots, per dozen pairs.	...	0.73
	Rubber shoes, per dozen pairs.	...	0.18
Japan	Rubber boots, per 100 pounds.	Net	18.82
	Rubber shoes, per 100 pounds.	Net	21.79
	Rubber accessories, per 100 pounds.	Net	19.43

Countries.	Articles and Remarks.	Weight.	Duty (U. S. Currency).
OCEANIA:			
Australia	Galoshes, rubber sand boots and shoes, and plimsolls, ad valorem	.....	30%
	Rubber gum and wading boots, ad valorem	.....	10%
New Zealand	Rubber footwear, ad valorem	.....	33 1/4%
AFRICA:			
South Africa	Rubber footwear, ad valorem	.....	20%
With a minimum of 100 lbs.	Men's	.....	\$0.18
	Women's	.....	0.12
	Children's	.....	0.06

Legal weight is not only construed, but generally includes the weight of the immediate packing or container, and in such cases fixed tare allowances are made.

Foreign Import Duties on Rubber Tires.

THE following table, corrected to November 20, shows the foreign import duties on rubber tires of all descriptions imported into various countries from the United States.

The column marked "Weight" shows whether duties are levied on net or gross weight, or include simply the inner packings. The next two columns give the rate of the duty per 100 pounds in United States currency or the rate per cent ad valorem.

In this monograph the surtaxes have been included and the converted rates therefore indicate the actual duty payable.

Certain charges such as warehousing, customs handling, local taxes, revenue stamps, etc., are not included. The rates of duty shown, including the surtaxes as noted, should therefore be regarded as the minima. As changes in duties are likely to occur at any time, frequent verification of these figures is advised.

COUNTRIES.	Weight.	Rate per 100 Pounds, U. S. Currency.	Rate Per Cent.—Ad Valorem.
NORTH AMERICA:			
Canada	.....	.....	42.5
(Ad valorem duties are based on the fair market value of the articles when sold for home consumption in the country whence exported direct to Canada.)			
Central American States—			
British Honduras	.....	.....	15
(Duties based on price in the port of export.)			
Costa Rica	Gross	\$4.22	.....
(In addition, there is a wharfage tax of 10.5 cents per 100 pounds.)			
Guatemala	Gross	7.21	.....
Honduras	Gross	4.28	.....
Nicaragua—			
Atlantic ports—Auto tires	Gross	3.81	.....
Solid tires	Gross	2.86	.....
Motorcycle tires	Gross	5.72	.....
Pacific ports—Auto tires	Gross	4.08	.....
Solid tires	Gross	2.99	.....
Motorcycle tires	Gross	12.25	.....
(An increase of 33 1/2 per cent of the duties is authorized but not in effect.)			
Panama	.....	.....	15
Salvador	Gross	13.81	.....
(A surtax of 1 1/2 per cent of the duty is included.)			
Hawaii	.....	.....	Free
(Imports of foreign origin are subject to the provisions of the United States tariff.)			
Mexico	Gross	16.94	.....
(New rates in effect November 1, 1916.)			
Newfoundland	.....	.....	49.5
West Indies—			
British—			
*Antigua	.....	.....	13.33
†Bahamas	.....	.....	20
*Barbados	.....	.....	11.25
*Dominica	.....	.....	12.5
*Grenada	.....	.....	10
Jamaica	.....	.....	16.66
*Montserrat	.....	.....	13.33
*St. Christopher-Nevis	.....	.....	11
*St. Lucia	.....	.....	16.5
St. Vincent	.....	.....	15
Trinidad and Tobago	.....	.....	10
Turks and Caicos Islands	.....	.....	10
Virgin Islands	.....	.....	10
Cuba	.....	.....	25
Danish—			
St. Croix	.....	.....	16.5
(Duty, based on the invoice price, increased 25 per cent [on imports from St. Thomas, 15 per cent].)			

COUNTRIES.	Weight.	Rate per 100 Pounds, U. S. Currency.	Rate Per Cent.—Ad Valorem.
St. Thomas and St. John	.....	.....	6
(Duty, based on price F. O. B. at port of export.)			
Dominican Republic	Net	\$36.29	.....
Dutch	.....	.....	3
French—			
Guadeloupe	.....	.....	6
Martinique	.....	.....	.....
(Rates not specified.)			
Haiti	.....	.....	22.24
Porto Rico	.....	.....	Free
(Imports from foreign countries are subject to the provisions of the United States tariff.)			
EUROPE:			
Austria-Hungary	Net	13.81	.....
Belgium—Solid tires	Net	5.69	.....
Auto tires	Net	10.16	.....
(Casings only.)			
Inner tubes	Net	14.88	.....
Bulgaria—Tires and tubes	Net	5.25	.....
Denmark—Auto tires	Net	6.08	.....
Solid tires	.....	.....	Free
Faroe Islands	.....	.....	Free
Finland—Auto tires	Net	9.55	.....
Inner tubes	Net	5.30	.....
France—Auto tires and tubes	Net	13.13	.....
Solid tires	Net	8.75	.....
Cycle tires	Net	21.89	.....
Germany—Auto tires	Net	6.48	.....
Inner tubes	Net	6.48	.....
Gibraltar	.....	.....	Free
Greece	Net	1.03	.....
Ireland	Net	0.24	.....
Italy—Auto tires and tubes	Net	5.25	.....
Malta	.....	.....	Free
Netherlands	.....	.....	5
Norway—Auto tires	Net	3.65	.....
Motorcycle tires	Net	3.65	.....
Portugal	Net	1.60	.....
(Conversion to U. S. currency based on the latest quotation of the paper milreis.)			
Roumania—Auto tires	Legal	9.06	.....
Solid tires	Legal	4.90	.....
Russia	Net	18.82	.....
Servia	Net	10.51	.....
Spain—Solid tires	Net	17.51	.....
Casings and inner tubes	Net	23.64	.....
Sweden—Auto tires	Net	14.59	.....
Solid tires	Net	9.73	.....
Switzerland—Auto tires	Gross	0.44	.....
Solid tires	Gross	0.09	.....
Turkey	.....	15.00	.....
SOUTH AMERICA:			
Argentina	Legal	10.51	.....
Bolivia	Gross	20.29	.....
Brazil	.....	.....	11.64
Chile	Legal	41.39	.....
Colombia	Gross	0.93	.....
Ecuador	Legal	9.96	.....
Guiana—British	.....	.....	16.5
(When imported from the United Kingdom, Canada or Newfoundland, admitted at a reduction of one-fifth of the duty.)			
Dutch	.....	.....	10
French	.....	.....	5
Paraguay—Casings and inner tubes	.....	.....	Free
Auto tires	Legal	38.08	.....
Peru—Auto tires	Gross	24.28	.....
Other tires	Legal	36.42	.....
Uruguay	.....	.....	45
Venezuela	Gross	10.28	.....
ASIA:			
British—			
Aden	.....	.....	Free
Ceylon	.....	.....	5.5
(Duty based on wholesale cash price in bond, less trade discount at the port of entry.)			
Cyprus	.....	.....	10
(Duty based on export price with addition of cost of transport [including insurance] to the port of final discharge.)			

*When imported from the United Kingdom, Canada or Newfoundland, admitted at a reduction of one-fifth of the duty. The cost of packing is excluded, except in Dominica, St. Lucia and Grenada, where it is included. †A surtax of 10 per cent is to be added.

COUNTRIES.	Weight.	Rate per 100 Pounds, U. S. Currency.	Rate Per Cent.—Ad Valorem.
Federated Malay States			Free
Hongkong			Free
India			7.5
(See note for Ceylon.)			
North Borneo			10
Sarawak			Free
Straits Settlements			Free
China			5
Chosen (Korea)			8
Dutch East Indies			10
French Indo-China			
(Imports from France are admitted free of duty, while imports from other countries are subject to the rates prescribed by the customs tariff of France.)			
Japan (including Formosa)—Auto tires..	Net		25
Cycle tires..	Net	\$42.92	
Persia			10
Siam			3
AFRICA:			
Abyssinia			10
Belgian Congo			10
British—			
Mauritius			12
Nigeria			Free
Union of South Africa			20
(Duty based on the current value for home consumption at the place of purchase, including value of packing and agent's commission if it exceeds 5 per cent.)			
Zanzibar			7.5
(The dutiable value of imports from Europe or America is taken to be the cost price [with charges], increased by 5 per cent or the invoice price [exclusive of charges], increased by 15 per cent.)			
Egypt			8
(In Alexandria a wharfage tax of one-half of 1 per cent is added. At other ports different rates are imposed.)			
French Algeria			
(Imports from France are admitted free of duty, while imports from other countries are subject to the rates prescribed by the customs tariff of France.)			
Italian—			
Eritrea			8
Libia			11
Somaliland			15
Liberia			12.5
Morocco			12.5
OCEANIA:			
British—			
Australia—Auto tires			35
Other tires			35
(Duty based on fair market value F. O. B. at port of export, plus 10 per cent. On casings weighing over 2½ pounds and inner tubes over 1 pound each, 48.6 cents per pound, if higher than the ad valorem rate.)			
New Zealand			Free
Guam			Free
(Imports of foreign origin are taxed 25 per cent of their value.)			
Philippine Islands			Free
(Imports of foreign origin are taxed 25 per cent of their value.)			
Tutuila			10

Legal weight is not uniformly construed but generally includes the weight of the immediate packing or container, though in some countries fixed tare allowances are made.

NEW JERSEY ZINC CO.'S PRICE NOTICE.

The New Jersey Zinc Co., New York City, announces the following prices on American process "Horse Head" brands of zinc oxide on contract for the first half of 1917:

	50 Ton	Less
	Base	Carloads
Selected, cents.....	10¼	10¾
XX, cents.....	9¾	9%

The above prices are based upon shipment in barrels and are f. o. b. shipping point, with usual freight allowance on carload lots, and are subject to change without notice.

The above products are also available in paper bags of 50 pounds net weight when shipped in carloads. In this container the price will be one-eighth cent per pound less than quoted above. Bags cannot be shipped in less than carload lots. Mixed carloads of barrels and bags cannot be shipped.

The American Chain Co., Bridgeport, Connecticut, manufacturer of Weed tire chains, has purchased the Standard Chain Co., Pittsburgh, Pennsylvania. Plans for combining the sales organizations and part of the office force of the two companies will probably be put into effect by January 1.

RUBBER-SHOD CATERPILLAR TRACTOR.

The development of the mechanical tractor has been a fertile field for the inventors of agricultural machinery who have endeavored to produce a machine that will satisfactorily solve the problems of plowing, cultivating, hauling and operating harvest-



ing and other farm machinery. Compared with horsepower, the tractor has obviously the advantage due to its availability at all times and a more diversified range of usefulness.

The types of wheeled tractors are varied and accomplish the many objects for which they are designed in a generally satisfactory manner, providing the ground or road over which they operate is firm and fairly even. On soft ground and uneven and broken roads, however, the caterpillar tractor is supreme, as its tractive power is almost unlimited and it performs equally well on solid ground and smooth asphalt or macadam roads without injury to the surface of the road.

The modified form of caterpillar tractor shown here is designed for hauling heavy loads over roads and soft ground where wheeled tractors would be at a disadvantage. The shoes of the tractor belt are shod with 24 blocks of solid rubber that increase the tractive power on both hard and soft ground and prevent damage to the road surfaces. [Martin Rocking Fifth Wheel Co., Springfield, Massachusetts.]

RUBBER MAKES A SALVAGE MACHINE POSSIBLE.

William D. Sisson, a New York engineer, has designed a remarkable apparatus with which to explore the bed of the sea, locate wrecked vessels and bring them to the surface. The outfit consists of a tender carrying a number of pontoons, and an almost spherical diving machine equipped with propellers, searchlights, a telephone to communicate with the tender, and four powerful electro-magnets. The latter hold the diving machine fast to the metal side of the sunken ship while an electric drill bores holes for fastening the pontoons. The diving machine is designed to work at any depth down to 2,000 feet.

This device would not be possible without rubber, of which each of these outfits will probably use 3,000 pounds for electrical insulation purposes alone, not to mention the use of rubber hose and rubber mechanical goods on the ship's tender and the rubber or rubberized garments that the crews will need to wear while at their work of raising from the bottom of the sea the treasures that have been lost through storm, attack or accident in the years since iron and steel ships supplanted wooden ones in the world's commerce.

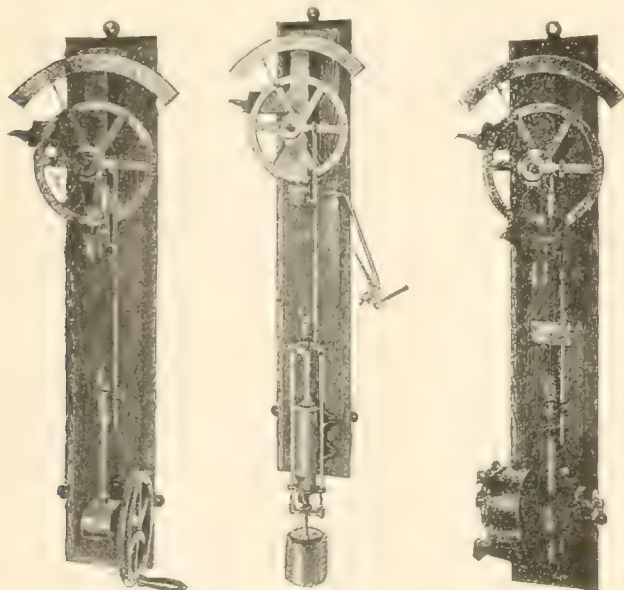
In this connection experiments have been carried on recently by Dr. Sylvio Pellico Portella in Rio de Janeiro, Brazil, using an apparatus somewhat similar to that noted above. An interesting feature is a series of floats of waterproof material, shaped like spheres, cylinders, etc., which are carried down by divers and attached to vessels and then inflated by air pressure from above.

New Machines and Appliances.

SINGLE STRAND TESTING MACHINES.

It is very important to know the strength of individual strands that make up the fabric used in tire building. To meet this requirement the single strand testing machines shown here have been designed. They are constructed on the dead weight principle, without springs or delicate parts requiring attention. The one on the left is operated by hand, and is built with 10-pound capacity by ounces, and 20-pound capacity by $\frac{1}{8}$ pounds. The intermediate one operates by weights, and has a 10-pound capacity by ounces. A motor-driven tester of 10, 20 or 50-pound capacity is shown on the right.

In each machine the drive is made by a non-revolving screw, operated by two spiral-cut gears held in a solid cast-iron housing and packed in grease. The recording head is built as a balance wheel, rotating upon two large, self-aligning ball bearings, and is extremely sensitive. There are no gears or other moving parts to interpose friction, and the pointer is attached directly to the



HAND POWER.

PLUNGER RELEASE.

MOTOR DRIVE.

balance wheel, indicating the breaking strain on a metal dial-segment. The pointer is held in the exact position of the break by a roll clutch, which prevents backlash, and is released and reset by a small hand lever.

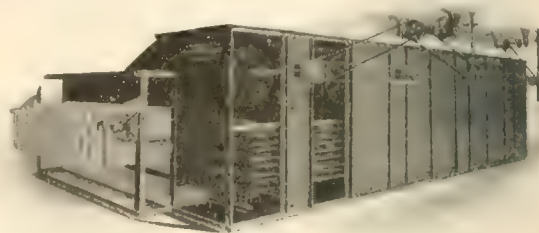
The clamps automatically hold the end of the finest yarns. The yarn is then passed over the eccentric, thereby obtaining additional clamping power and giving the tests all the advantage of the spool form without tying. Standard machines are arranged with a distance of 12 inches between spool centers. Loop tests are easily made with this equipment. A novel and easily read compensating stretch device is included on each machine, giving the net stretch at a glance. [Henry L. Scott & Co., Providence, Rhode Island.]

"HURRICANE" FIREPROOF AUTOMATIC DRYERS.

The vast quantity of plantation rubber now being produced in the Far East must perforce be dried before it is packed and shipped to the markets of the world. The problem of drying 108,000 tons, last year's production, must have involved much time, labor and incurred considerable cost to the producers. The automatic drying machine here illustrated

is successfully used for drying a variety of wet materials analogous to crude rubber and therefore presents a suggestion worthy of consideration.

The machine is divided into sections and the heat is so regulated that the material finally emerges in a cool, dry condition. The dryer is divided longitudinally into two com-



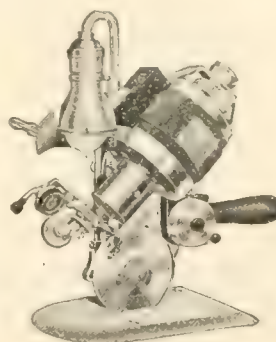
partments, one containing the heating coils and the other the endless chain conveyor that carries the material through the machine. Located in the upper part are the fans producing the recirculation of the air.

The drying is accomplished in accordance with the well-known counter-flow principle. The material is slowly carried through the dryer by the conveyor. The general movement of the drying air is directly opposite to this, as the fresh dry air is admitted near the delivery end of the machine. The air is constantly recirculated by the fans, alternately through the material and steam coils, and progresses in a spiral manner through the machine. During this process, the temperature of the air is gradually raised and its capacity for taking up moisture is thereby increased.

Thus the material as it enters the dryer in a cold, wet condition is subjected to the greatest amount of heat, and the greatest amount of evaporation is accomplished. The rapid evaporation of moisture tends to prevent the absorption of an undue amount of heat, so that no injury to the material can result at this stage. As it becomes drier and passes further through the machine, it encounters less and less heat, and is subjected to cooler and drier air. Near the end of the operation it comes in contact with fresh, cool, dry air, so that the final moisture is readily removed and the material delivered dry and cool. [The Philadelphia Drying Machinery Co., Philadelphia, Pennsylvania.]

THE EASTMAN ELECTRIC CLOTH CUTTER.

Motor-driven cloth cutting machines are labor saving devices that could hardly be dispensed with by manufacturers of rubber clothing and other apparel of a like nature. That these machines have a wider field of usefulness is shown by the increasing call for motor-driven cloth cutters from manufacturers of gaskets and automobile tires.

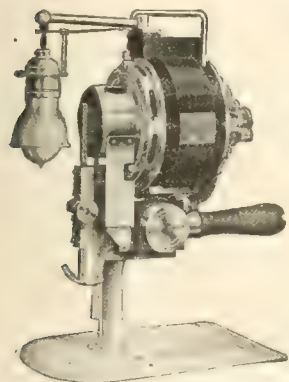


The machine shown in the first illustration is of the reciprocating knife type and built to operate on 110 or 220-volt direct or alternating current. It is equipped with a powerful motor and all bearings are a combination ball and roller bearing type which divides the wearing strain over a large surface and reduces wear and tear to the minimum.

This machine is recommended for all-round work where the lays are higher.

It will cut curves or straight lines equally well in material varying from the lightest silk to the heaviest cotton fabric.

The round knife type shown in the second illustration is also operated on either 110 or 220-volt direct or alternating current. A notable feature of this machine is the standard,

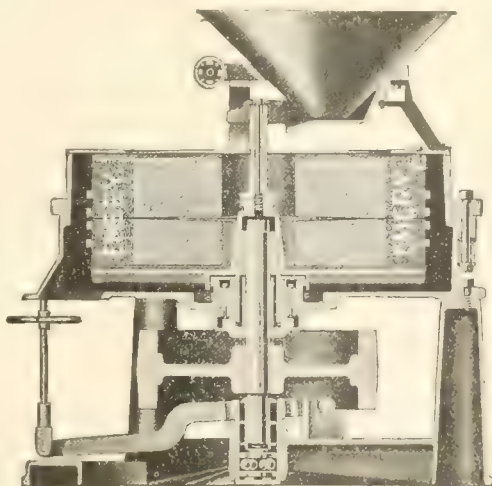


which is so arranged that as the knife wears down it can be lowered into the plate. This makes the blade last longer and insures accuracy of workmanship, as the edge of the blade is always kept close to the throat-plate. It has a knife guard which is a positive protection against the operator cutting himself.

The adjustable sharpening device is arranged so that both sides of the blade are sharpened simultaneously, thereby doing away with any wire edge on the knife. Moreover, the sharpening device is adjustable so that the operator can obtain any kind of bevel he prefers. [Eastman Machine Co., Buffalo, New York.]

THE STURTEVANT DUST GRINDER.

That the grinding principle of the ancient mill-stone had long since been replaced by newer machines of modern design and construction was a reasonable supposition. That such is not entirely the case, however, is indicated by the accompanying illustration of a modern grinder with upper and nether mill-stones of rock emery. It is the more interesting from the fact of its comparatively recent adaptation for comminuting hard and soft rubber and grinding leather scrap for making leather and rubber soles.



The upper, or bedstone, is bolted to the top casing and is lowered with it directly upon the lower, or runner stone. The clamping ring is next tightened to hold the bedstone case and stone immovably in position and the runner is then lowered away from the bedstone by a hand wheel which regulates the fineness of grinding required.

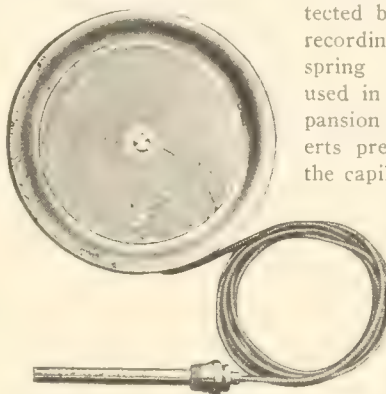
As in the old principle the material is fed at the center and is gripped between the mill-stones, passing through a continuous rubbing, shredding and tearing action as it works its way by centrifugal force to the periphery where it is discharged into a suitable receptacle.

A duplicate plant consisting of four 42-inch horizontal mills and four special screens, recently installed, has produced, it is claimed, 12,000 to 13,000 pounds of 40-mesh soft rubber dust per day from one unit. That scrap leather and hard rubber may be successfully ground on this machine is obvious. The 42-inch mill is 5 feet long, 5 feet wide and 5 feet high, weighs 5,500 pounds, gross, and requires 18 horse-power. [Sturtevant Mill Co., Boston, Massachusetts.]

VULCANIZER RECORDING THERMOMETER.

A new type of thermometer for recording vulcanizing temperatures up to 800 degrees F., or 425 degrees C., which embraces a number of original features, is shown here. It operates on the principle of the expansion of gas with change in temperature.

A bulb of copper containing nitrogen gas under pressure is connected to a recording instrument by a small copper tube protected by flexible steel tubing. The recording instrument has a helical spring somewhat similar to that used in pressure gages, and the expansion of the gas in the bulb exerts pressure which is conveyed by the capillary tube to the helix, which expands proportionately.



This helix is directly connected to a recording arm and pen which marks on the record chart. Tubing as long as 100 feet can be furnished, if required, so that the recording gage

may be placed at some distance from the point where the temperature is measured. The clock which revolves the chart is mounted directly on the front plate on which the chart rotates, insuring alinement of the clock and chart plate.

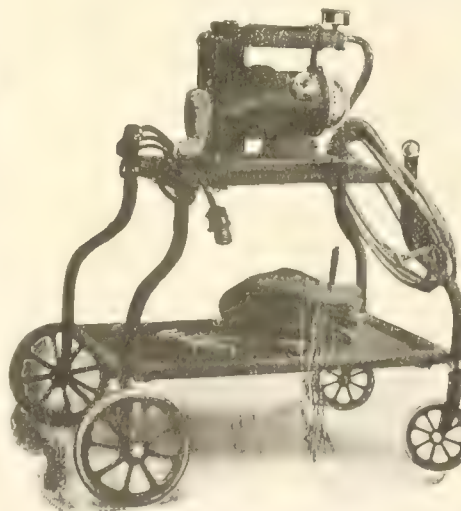
The clips holding the chart in position are mounted on the door so that when the door is opened they are automatically swung away from the chart, permitting its easy replacement without interference.

A device is furnished which raises the chart pen from the chart automatically when the door is opened, and frees the pen automatically when the door is closed.

This instrument is also made in indicating form, where desired, to indicate the temperature on a dial instead of recording it on a chart. Several different types of bulbs may be had, either with threaded connection for insertion in mains and pipes, or with lead coating to withstand chemicals and acids. [The Brown Instrument Co., Philadelphia, Pennsylvania.]

A PORTABLE ELECTRIC TIRE PUMP.

The Lectorflator principle apparently reduces the annoyance of tire inflation to the minimum. The carriage outfit shown in the illustration is a combination of a universal motor that will run on



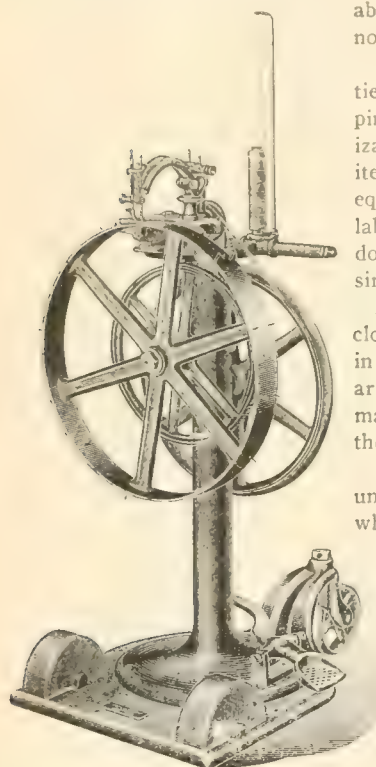
either alternating or direct current, a high-pressure air compressor, a gear box and a condensing chamber, so arranged that all elements are enclosed in a single housing and automatically cooled. It is mounted on a strong, light carriage that is provided with a convenient tool tray and equipped with four rubber-tired wheels.

This outfit has been especially designed to meet the demand of public garages, tire sales rooms and other public places which must dispense free air, but wish to avoid the larger investment, higher operating expenses and loss of space required by large compressor and tank systems.

Each machine is fitted with a long electric cord, attachment plug, gage, high-pressure hose and quick-acting coupling. It will operate from any 110-volt lamp socket and is guaranteed to develop 125 pounds air pressure without overheating. It has a displacement of about $2\frac{1}{2}$ cubic feet of air per minute and will inflate the largest tires to 100 pounds pressure in one or two minutes. [The Black & Decker Manufacturing Co., Baltimore, Maryland.]

A PORTABLE FOOT-POWER SEWING MACHINE.

Here is a light, portable foot-power sewing machine that can be used in any department of a rubber mill where end-piece sewing is required. It is self-contained and designed for moving



about when the use of power is not practical nor convenient.

In tire plants where quantities of rags are used for wrapping the treads during vulcanization, end-piece sewing is an item that includes necessary equipment and considerable labor, both of which could doubtless be reduced by this simple machine.

In footwear factories where cloth books are a necessity and, in fact, wherever cloth liners are used, the need of a sewing machine for joining together the ends is apparent.

The ends of the cloth to be united are laid on a large feed wheel that is provided with holding pins which maintain the two pieces of cloth in relative position and at the same time permit the cloth being stitched during the sewing operation. It is arranged so that the feed wheel can be instantly thrown out of

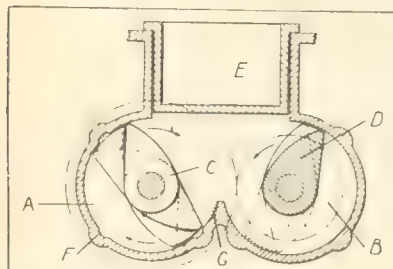
gear and thereby short stitches and the breaking of needles are entirely obviated.

This machine will sew all kinds of cotton or woolen goods, thick or thin, wet or dry, and is carefully constructed. [Dinsmore Manufacturing Co., Salem, Massachusetts.]

MACHINERY PATENTS.

THE BANBURY MASTICATOR.

THIS machine is of the Pointon type and provided with revolving blades which act in conjunction with stationary surfaces imparting a kneading action to the mass. The drawing



is a cross section of the machine, which is duplex in character, comprising two cylindrical casings A and B in which the two rotors C and D revolve towards each other. The rubber being placed in the hopper at the top, is fed by the weight of plunger E to the rotating blades. The inclined blades of the rotors force the material continuously from the ends of the machine to the

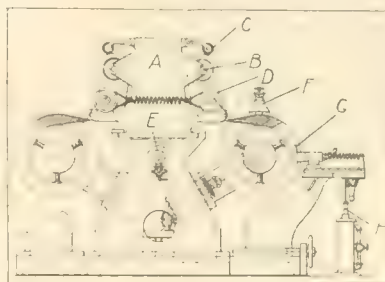
center, rolling and kneading the rubber against the walls of the cylindrical casings until it is thoroughly massed. The casing walls may be smooth, as shown on the right, or provided with grooves shown at F; moreover, the entire surface may be serrated as shown at G. [Fernley H. Banbury, East Orange, New Jersey, assignor to Birmingham Iron Foundry, Derby, Connecticut. United States patent No. 1,200,070.]

PNEUMATIC TIRE BUILDING MACHINE.

The old-time hand method of building tire casings has long since proved to be unequal to the present high production standards. The development of tire building machines has therefore

progressed steadily and the modern American type is almost entirely automatic. The strips of frictioned fabric are supplied under tension to the revolving core and the successive plies smoothed down by rollers.

Paridon's invention, however, possesses cer-

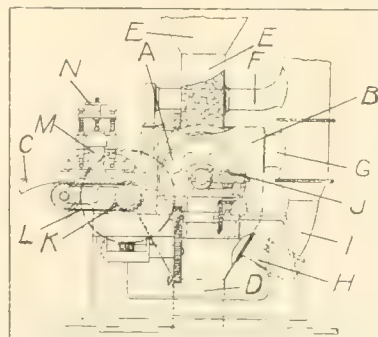


tain novel features that are radical departures from the customary design and are therefore interesting.

The drawing is an end elevation of the machine, which is duplex in construction. The description applies to both units, but will be confined to the one on the right. There are four frames, only one being shown at A, which support two sets of fabric rolls B, liner rolls C and tension rolls D. The frames are moved longitudinally to bring the fabric rolls alternately in line with the core by a reciprocating hydraulic piston E, operated by a four-way valve. As the fabric strip is applied to the core, adhesion of the successive plies is assisted by a jet of air from the nozzle F. The two smoothing rollers G are operated by rack and pinion movement controlled by the vertical hydraulic piston H. The front faces of the smoothing rolls are recessed with convolute openings through which air is forced, materially aiding the stitching operations and preventing the formation of air bubbles between the fabric plies. [Michael Paridon, assignor of one-half to Henry A. Rudd, both of Barberton, Ohio. United States patent No. 1,202,884.]

RUBBER DUST GRINDING MACHINE.

The Gardner machine for reducing rubber to fine powder is of the type in which an abrasive cylinder is rotated and which at the same time receives an axially reciprocating motion. The



The cylinder A is formed with a series of abrasive strips set longitudinally on its periphery, between which, openings are arranged for the flow of air forced outwardly by internal fan blades. The cylinder is mounted in a casing B provided with openings for the feed of the material C, a hopper D at the bottom which receives unground fragments, and a hopper E at the top by which the unground fragments are returned to the grinding-cylinder. The casing and the upper and lower hoppers are connected by screened pipes F, G, H with a suction trunk pipe I leading to a draw-off fan and receptacle for the rubber dust. The axle of the cylinder is reciprocated by a bell-crank lever J operated by worm gearing, connected

by a shaft and gearing to the main drive shaft *K*. The feed-mechanism consists of an endless belt *L* provided with projections and spring-pressed rollers *M* that are adjusted by hand wheels *N*. [C. E. Gardner, Gloucester, Gloucestershire, England. British patent No. 10,015 (1915).]

MACHINE FOR MOLDING AND VULCANIZING HOLLOW RUBBER ARTICLES.

According to this invention the method of making rubber bulbs is simplified and the production materially increased. Briefly, the operation consists in drawing the stock by vacuum into the mold cavities, the edges of the two halves of the bulb being then brought into close contact and vulcanized.

The drawing is a vertical section of the machine, which is a three-ram type of hydraulic press. The mold plates *A* and *B* comprise 25 mold cavities, each being provided with a small opening communicating with air chambers *C* and *D* in the upper and lower head.

Two metal plates, adapted to support the disks of rubber stock,

are placed back to back and inserted between the mold plates where they are alined by dowel pins. The mold is then closed by the hydraulic rams *E* and *F* and a vacuum applied to the air chambers, exhausting the air in the mold cavities and thereby drawing the rubber stock into them. When the bulb halves have thus been molded, the mold is opened and the metal plate removed. Then the hollow platen *G* is moved upward by the ram *H* until it contacts with the sealing gasket in the upper platen. Air under pressure is admitted to the hollow platen, filling the mold cavities, and then the lower mold is raised by the rams *E* and *F*, thereby closing the mold, uniting the bulb halves and entrapping a certain amount of compressed air. The bulbs are vulcanized by exhausting the air and admitting steam to the chambers surrounding the mold. [Fred T. Roberts, Trenton, New Jersey, United States patent No. 1,201,503.]

A more recent invention by the same inventor provides a process and apparatus for releasing hollow inflated articles from the molds. [Fred T. Roberts, assignor to the Aranar Co.—both of Cleveland, Ohio. United States patent No. 1,201,627.]

OTHER MACHINERY PATENTS.

THE UNITED STATES.

- 1,201,397. Tire repair vulcanizer. F. S. Wahl, North Tonawanda, assignor of one-half to G. G. Mattein, Kenmore—both in New York.
- 1,201,406. Apron for mixing mills. H. A. Welton and H. J. Hoyt, assignors to Morgan & Wright—all of Detroit, Mich.
- 1,201,473. Device for painting golf balls. C. H. Lambert, Asheville, N. C.
- 1,201,774. Machine for constructing a laminated cohesive interwound fabric band. L. A. Subers, East Cleveland, Ohio.
- 1,201,778. Tire mounting implement. W. L. Weber, assignor to The Esenkay Products Co.—both of Chicago, Ill.
- 1,202,452. Tire rim tool. J. B. Stroud, Pass Christian, Miss.
- 1,202,654. Rim tool. F. A. Berry, Loudon, Tenn.
- 1,204,021. Portable vulcanizer. E. T. Horsey, Cleveland, Ohio.
- 1,204,213. Tube wrapping machine. J. A. Vey, assignor to Continental Rubber Works—both in Erie, Pa.

- 1,204,342. Machine for wrapping hose and similar articles. H. Z. Cobb, Winchester, Mass., assignor to Revere Rubber Co., Olneyville, R. I.
- 1,204,357. Apparatus for treating fibrous materials. E. D. Jefferson, Boston, Mass.

THE DOMINION OF CANADA.

- 171,104. Tire rim tool. The Burrill Tire Tool Co., assignor to F. H. Burrill—both of Concord Junction, Mass.
- 171,174. Tire rim tool. A. A. Friestedt, Chicago, Ill.
- 171,440. Machine for winding tape on wire. Canadian Consolidated Rubber Co., Limited, Montreal, Quebec, Canada, assignee of T. Midgley, Lancaster, Ohio.
- 171,637. Rubber heel mold. J. G. Tufford, Elyria, Ohio.
- 171,656. Flap trimming machine. The Canadian Consolidated Rubber Co., Limited, Montreal, Quebec, Canada, assignee of T. Midgley, Lancaster, Ohio.

THE UNITED KINGDOM.

- 9,039 (1915). Apparatus for treating rubber latex. S. M. Mac, 114 Grange Road, Edinburgh.
- 9,427 (1915). Tool for tapping rubber trees. F. E. Lease, Sapong Estate, British North Borneo.
- 9,454 (1915). Pneumatic tire mold with expansible ring. F. A. Byrne, 2 Ludgate Hill, Birmingham.
- 101,325. Guards for rubber mills. L. Gaisman, 106 Birch Lane, Longsight, and S. Dreyfus, Thorncliffe Villa, Windmill Lane, Denton—both in Manchester.
- 101,395. Rubber tapping tool. S. John, 401 North Bridge Road, Singapore.
- 101,416. Rubber pad in sole laying machine. Atlas-Werke Pohler & Co., Stotteritz, Leipzig, Germany.

THE FRENCH REPUBLIC.

- 480,512 (December 23, 1915). Improvements in cores used in vulcanizing. Heinig Johnston and Ohls.
- 480,583 (December 31, 1915). Improvements in apparatus for molding tires. J. H. Coffey and Coffey, Jr.

PROCESS PATENT.

ELIMINATING POROSITY IN RUBBER SOLES. The parts comprising the bottom being assembled, they are placed in a chamber and subjected to a temperature of 130 to 135 degrees F. for 36 hours, thereby eliminating all air, naphtha or other entrapped gases. The bottoms are then attached to the upper and the boot or shoe is vulcanized. [W. Mellersch-Jackson, London, England. (Communication from Boston Rubber Shoe Co., Malden, Massachusetts.) British patent No. 16,226 (1915).]

OTHER PROCESS PATENTS.

THE UNITED STATES.

- 1,202,244. Process of manufacturing brushes. A. H. Inniss, Harrow, assignor to Rubber Set Brush Co., Limited, London—both in England.

THE DOMINION OF CANADA.

- 171,196. Process for the manufacture of tire fabrics. L. Lias, Paris, France.

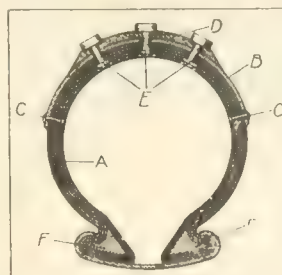
THE FRENCH REPUBLIC.

- 480,713 (January 19, 1916). Process for manufacturing rubber eye-glass frames without seams and without using a mold. E. Kalker.
- 480,735 (January 20, 1916). Elastic fabric adapted to masks for protection against asphyxiating gas; to suspenders, corsets, orthopedic articles, etc., and process for its manufacture. L. Brun.

MISCELLANEOUS PATENT.

A FRENCH STUDDED-TREAD TIRE.

In this tire the use of rubber has been avoided as much as possible. The casing is built up in the usual way, of several plies of frictioned fabric. On this is fitted a protecting cover made of leather or similar material and provided with metal studs.



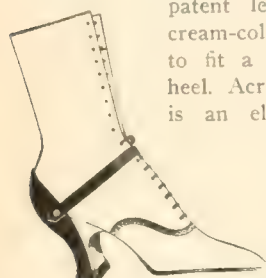
Referring to the cross-section of the tire, *A* is the casing and *B* the leather protecting cover which is held in place by rivets *C*.

The leather tread *D*, which may be made of other material than rubber, if desirable, is fastened to the protecting cover by stud-rivets *E*, which extend through the fabric plies. The beads *F* are made of leather, or similar material, and applied to the casing in the usual manner. [K. Pauli and Benniger. French patent No. 480,166 (July, 1915).]

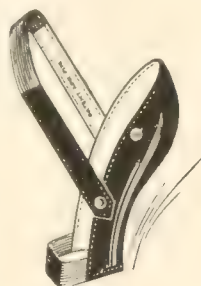
New Goods and Specialties.

JOHNSON'S HEEL PROTECTOR.

WOMEN who drive their own cars will be interested in the patented device shown herewith, for guarding the heel of the most delicately shod foot from all danger of scuffing while manipulating the pedals.



The neat appearing shield of patent leather, lined with cream-colored kid, is shaped to fit a feminine style of heel. Across the lower edge is an elastic band about

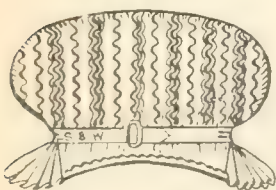


three-quarters of an inch wide, which can be slipped over the heel of the wearer's shoe, and a longer strap made partly of elastic and partly of patent leather, is sewn to the upper part of the guard on one side and

detachably fastened to the other by a metal clasp. [C. H. Wolfelt Co., Los Angeles, California.]

NON-BREAKABLE BATHING CAP.

The bathing cap illustrated here shows several novel features. It is made of a new and original rubber fabric, wave-striped in contrasting colors, the result being an attractive material particularly adapted to the purpose. The head-band is of a sort specially intended for use where it may be subjected to moisture.

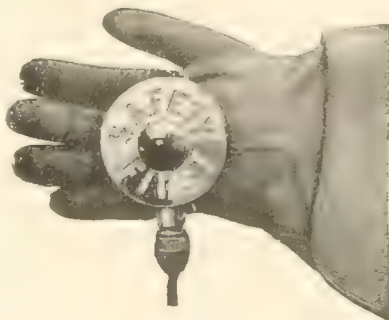


Elastic webbing is encased completely with rubber and vulcanized, thus producing a thoroughly waterproof elastic tape. The claim is that the rubber threads, protected from air and moisture, will retain their elasticity and consequent durability for a much longer time than would similar

fabric not so protected. This elastic, non-breakable tape is also to be used for garters, belts, hose-supporters, suspenders and skirt-facings. [S. & W. Rubber Manufacturing Co., Inc., College Point, New York.]

"SAFETY FIRST" HAND SIGNAL.

The familiar method of signaling with the outstretched hand in automobile driving, when about to stop, slow down or turn a corner, is made effective at night as well as by day by means of a small electric lamp attached to the hand or wrist of the driver, after the manner of a wrist watch, by an elastic band which holds it firmly in place. This two-candle-power, 6 to 7-volt lamp obtains the necessary current through a small cord from a socket in the dash board, and consumes so little that it can be kept lighted at all times and ready for use whenever the driver has occasion to signal. A lamp of different voltage may be substituted, if desired.



The entire equipment is so small and light that its presence on the back of the hand is scarcely noticed by the wearer. It is three inches in diameter and one inch thick. The one-inch ruby

bull's-eye in the center is surrounded by the word "Safety First," cut in the polished nickel case and showing clearly through a lining of white celluloid. [Pittsburgh Electric Specialties Co., Pittsburgh, Pennsylvania.]

BEECHING'S MOISTENER.

The construction of this novel moistening device is simple and effective, needing no adjustments. A soft rubber sleeve completely encircles the glass water container, thereby avoiding all danger of defacing the most delicately finished desk or table.



As will be seen in the illustration, the openings in the rubber are surrounded by slight rings or curbs, so that all of the water does not run back into the container, a thin sheet of moisture being held for use. Another curb sur-

rounds the moistening space, and should the rubber carry up more than the necessary quantity of moisture, small ridges or curbs guide the surplus water back into the receptacle. The moisture is renewed instantly by a slight pressure on the rubber sleeve. [Kimpton, Haupt & Co., New York City.]

ALL RUBBER TOBACCO POUCH.

A dark gray, circular rubber bag, 5½ inches wide and 5 inches deep, affords a handy, flexible receptacle for tobacco which can



be easily carried in the pocket. This bag has a strongly made stitched seam at the lower edge and a band of black fabric at the top, through which is run a narrow black cord, which acts as a drawstring. [United Cigar Stores Co., New York City.]

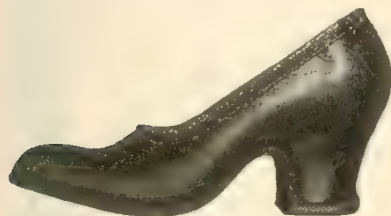
A NEW DENTAL RUBBER.

Ordinarily, dental rubbers are manufactured from a standard formula, merely by weight, but this improved rubber, intended as a base mounting for porcelain teeth, is prepared according to a special formula, balancing each individual ingredient. It is claimed that the resultant product shows minimum shrinkage, maximum density, takes a high luster with little effort, and remains almost permanent in color, the only change affecting it being solarization; also, that this is the only dental rubber that gives perfect adaptation in the retention spaces of the teeth, hugging tightly any part of the porcelain with which it comes in contact and thus elim-

inating pockets in which food might accumulate. Rubbers made according to this formula are supplied in various colors acceptable to the dental profession. They are not affected by climatic change and can be packed in cases either cold or hot. No foreign materials, such as oils or waxes, are employed to insure plasticity, which is accomplished by purely mechanical means. [The S. S. White Dental Manufacturing Co., Philadelphia, Pennsylvania.]

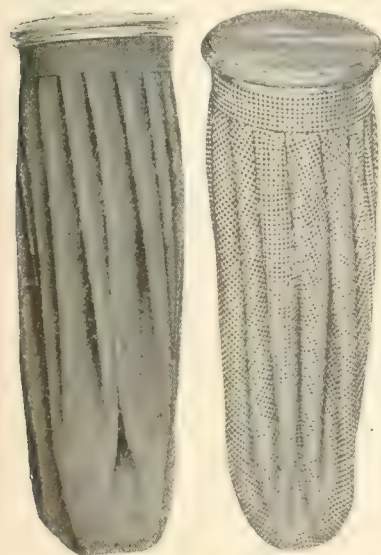
THE LORETTA LAST, "STRAIGHT-LINE" RUBBER.

The rubber shown here is a handsome one, designed to fit over the latest models of this season's leather footwear for women. It has a medium broad toe of moderate height, and is intended to be worn with the full Louis or Cuban heeled boots. The vamp is of generous height, while the back is sufficiently high to cover the quarter of the shoe or boot over which it is worn. The sole is "rolled edge" and runs in an unbroken piece from the toe up under the instep, along the face of the heel, and thence along the tread. The reinforcements are generous, and the finish such as to commend it to critical buyers. [The B. F. Goodrich Co., Akron, Ohio.]



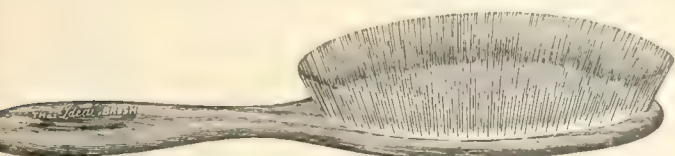
ROUDEN ICE BAGS.

A highly useful article, formerly confined to European manufacture, but now made in America and supplied to European and South American trade, is the ice bag shown in two styles in the accompanying illustration. These bags are made in red, checked and brown rubberized materials of excellent quality, and are furnished in no less than 20 sizes, including the centimeter sizes required in Europe and Latin America. The neck of the bag is worked on the collar of a screw cap of zinc metal in a manner that insures permanence. Before leaving the factory, each bag is tested to a pressure of 200 to 300 pounds. [Rouden Manufacturing Co., New York City.]



HUGHES "IDEAL WATERPROOF" HAIRBRUSH.

The Hughes "Ideal" hairbrush, with bristles set in a rubber pad, has been on the market for many years. Continued experiments have been made, however, with a view to perfect its



lasting and sanitary qualities, and an improved model, here shown, is now offered under the trade name of Hughes "Ideal Waterproof." It is claimed that there is nothing in this brush

that water can loosen, rust or destroy and it can, therefore, be thoroughly cleansed as frequently as desired. Short and long stiff boar bristles are vulcanized into a cushion of rubber, which is automatically fastened to the handle so that it cannot loosen. The handle, although highly polished in dark mahogany finish, is waterproof and retains its luster after washing. [Henry L. Hughes, New York City.]

"BOODLE BAG" WITH ELASTIC BANDS.

This safeguard device for money or other valuables is secured by two elastic bands fitted with stout clasps, attached about the



leg just below the knee, underneath the stocking. The container is in two sections, thus avoiding any necessity for a bulky and uncomfortable projection when filled. These two flat, oblong cases are made in all varieties of material, from serviceable poplin to the daintiest of silk brocades, and are fastened by means of a flap with metal clasps. The "boodle bag" is an exceptionally presentable article, of great convenience for both men and women when traveling, bathing, golfing, etc. [Boodle Bag Co., Chicago, Illinois.]

SPONGE RUBBER CORN SHIELD.

It is generally understood that corns originate from the pressure of ill-fitting shoes and that to remove that pressure eliminates the trouble. A new corn shield designed for this purpose consists of a ring of sponge rubber, one side of which is porous, the other smooth, and made in various thicknesses to suit the case. This material offers a yielding surface and yet does not pack down as do other pads, and it is claimed that these shields will keep fresh and last indefinitely. The same shield can be removed and applied as often as desired, and can be readily cleansed with warm water and soap.

In using this shield, a small amount of Lexel adhesive gum is applied to the smooth side and allowed to dry for not less than a minute, after which it is placed next to the flesh. [Lexel Foot Ease Co., Ashland, Ohio.]

SUCTION SINK STOPPER.

Stoppers for sinks, set basins and bath tubs are usually made of metal or rubber, and are intended to fit tightly. But as a result of constant wear they become more or less bothersome.

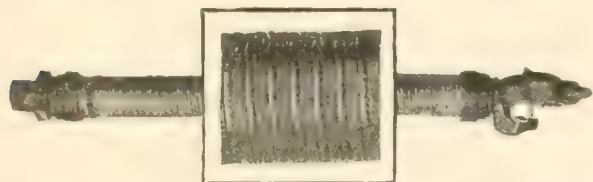
Stoppers which depend not upon tight fit, but upon suction or pressure, are made of red rubber in various sizes. There is a plug, which may fit more or less perfectly into the outlet; this, however, being simply to hold the stopper in place. The actual retention of the water is accomplished by its own pressure on the large, flexible rubber disk forming the top of the stopper. The metal post, holding the ring, is molded in the rubber, and will not work loose nor allow leakage through the fitting. [The Durst Manufacturing Co., Inc., New York City.]



"GOODALL SEMI-METALLIC" HOSE.

For severe service and for use under high pressures of steam, air, water, etc., the most satisfactory hose should contain the virtues of both metal and rubber; that is, it should have the

strength and durability of steel, the flexibility of rubber, and be capable of being twisted and turned with little effort and yet without kinking. In the semi-metallic hose shown herewith, a rubber tube overlaid with fabric, similar in construction to the



usual rubber hose, is encased in steel armor. It is claimed that this hose will withstand the highest pressures and render exceptionally long service, being fully protected from external injury while retaining the pliability of an all rubber hose. [Goodall Rubber Co., Inc., Philadelphia, Pennsylvania.]

MOTORCYCLISTS' CLOTHING.

There is no mode of travel as hard on wearing apparel as motorcycling, nor as hard on the cyclist if he be inadequately protected. The force of the wind striking against his body is



tremendous, and air and the dust of the road insinuate themselves into every pore. The stoutest waterproof material, capable of withstanding the most adverse elements, must necessarily be used. Improvements are constantly being made in motorcyclists' clothing, both in fabric and style, and the English and

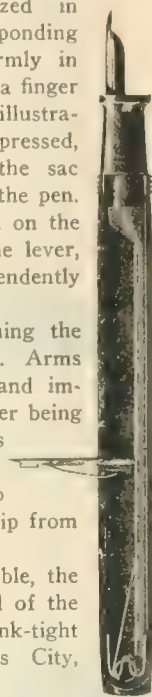
both single- and double-breasted, with a rear view of the double-breasted model. [The North British Rubber Co., Limited, Edinburgh, Scotland.]

FOUNTAIN PEN WITH SNAP LOCK LEVER.

The special feature of this fountain pen is contained in the improved snap-lock device in the body of the pen, consisting of a raised portion of the metal collar vulcanized in the barrel, and engaging a corresponding groove in the section, holding it firmly in position. By operating the lever with a finger nail stop, shown in the accompanying illustration, the ink reservoir is entirely compressed, thereby preventing the twisting of the sac and consequent trouble when refilling the pen. Other lever-type fountain pens depend on the aid of the pressure bar to operate the lever, but this lever operates by itself independently of the pressure bar.

An entirely new method of fastening the clip to the cap has also been employed. Arms of the clip are inserted in the cap and immersed in a soft substance, which, after being treated by a patented process, is changed to a rock formation anchoring the clip in such a manner as to distribute the strain and prevent the clip from ever becoming loose.

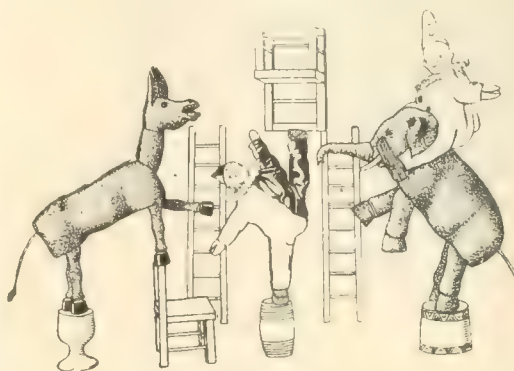
This pen is claimed to be non-leakable, the shoulder fitting tightly against the end of the barrel and forming an air-tight and ink-tight chamber. [Kraker Pen Co., Kansas City, Missouri.]



"MADE IN AMERICA" TOYS.

The fact that we are cut off from foreign toy markets on account of the European war adds new interest to toys of American manufacture. The A. Schoenhut Co., Philadelphia, Pennsylvania, is the maker of "Humpty Dumpty Circus" toys,

comprising an infinite variety of miniature animals, circus actors and paraphernalia which can be posed in all the "stunts" known to real performers under the Big Tent, as well as some unheard of on land or



sea. These laughter-provoking toys are made of wood and leather, their remarkable flexibility being attained by the use of rubber cords in joining together the different parts of the animals and figures.

The "Rolly Dolly" toys, one of which is also shown, are grotesquely amusing figures of practically unbreakable construction and painted with oil colors and heavy enamel varnish so that the paint will not come off. The head of the toy is attached by a rubber cord, causing it to wag in a droll fashion as the toy is rolled about. The "Rolly Dollys" are made in various sizes, from 6¼ to 10½ inches high.



French today are leaders in practical wearing apparel for this purpose. The upper illustration shows the latest styles in seatless trousers and leggings, and below are new motorcycle coats,

The Editor's Book Table.

THE STABILITY OF VULCANIZED RUBBER AND THE OPTIMUM Cure. By Henry P. Stevens, M.A., Ph.D., F.I.C. Reprinted from "The Journal of the Society of Chemical Industry," London, England.

THIS pamphlet, of value to every manufacturer of vulcanized rubber, recapitulates the common knowledge of the subject, such as the danger of over-curing with consequent hasty deterioration of the vulcanized product, the tendency toward under-curing in order to prolong the life of the product and the fact that this also causes gradual deterioration. The methods of Schidrowitz and of Eaton and Grantham to determine the temperature, period of heating, etc., which will yield the perfect or optimum cure are explained, and it is pointed out that both methods fail to take into consideration the fact that the tensile properties of a vulcanized rubber vary with the age of the specimen. Figures obtained in any sort of tensile or stretching tests will vary accordingly, inasmuch as vulcanization appears to continue very slowly at the temperature of the air. Thus Dr. Stevens concludes that any optimum cure method based only upon load and elongation figures is valueless for technical purposes; rather that it should be based upon a correlation of physical properties and aging tests.

Then follows a corroboratory description of exhaustive experiments with tabulated results, which were more fully referred to in THE INDIA RUBBER WORLD, October 1, 1916. In studying these it is particularly interesting to note that the crêpe rubber compounds cured for 3, 3½ and 4 hours all show greater deterioration over any given period than the corresponding sheet rubber compounds. This Dr. Stevens attributes to the method of preparation. Whereas sheet rubber is merely squeezed after coagulation and retains the original shape of the coagulated rubber, crêpe rubber is put several times through a washing mill where it is torn up and ground in a stream of water. In his experience, the extent to which rubber is worked previous to vulcanization tends to reduce the life of the vulcanized product.

THE FUNCTION OF LITHARGE IN THE VULCANIZATION OF Rubber, Part II. By Henry P. Stevens, M.A., Ph.D., F.I.C. Reprinted from "The Journal of the Society of Chemical Industry," London, England.

Dr. Stevens here reviews and discusses the investigations which have been made to determine the influence of the resinous constituents. In 1912 Beadle and Stevens showed that the removal of the greater part of the resins by acetone extraction retarded the cure, impaired the tensile properties and increased the perishability of the vulcanized product. L. E. Weber corroborated these statements and even expressed the belief that "the resins play an active part in the vulcanization, and not merely as a catalyzer, their presence being absolutely essential," in fact that the compound prepared from resin-extracted rubber "could not be vulcanized," this latter statement being based upon the poor tensile properties of the rubber.

In the present pamphlet, however, Dr. Stevens maintains that rubber may possess poor tensile properties and yet be vulcanized to some extent or even over-vulcanized. He refers to his own investigations to the effect that the degree of vulcanization is largely dependent upon the relative proportions of rubber, sulphur and litharge in the compound, and points out that the highly specialized type of compound containing litharge which Weber employed appears to be hardly suited to the purpose of ascertaining the specific vulcanizing properties of any particular rubber sample. The fact that an essential criterion of a properly cured rubber is its aging quality was also emphasized, any conclusion based upon the coefficient of vulcanization or upon physical tests with the freshly vulcanized specimen without taking the aging quality into consideration being inaccurate. Then fol-

lows a detailed account with considerable tabular matter descriptive of an exhaustive series of tests pointing to the following conclusions:

Certain types of litharge compounds cannot be sufficiently vulcanized to bring out their full tensile properties and coefficient of vulcanization without over-curing and consequent deterioration or "perishing" with age. The removal of resinous matter by acetone extraction retards vulcanization, as indicated by the tensile properties and coefficient of vulcanization, particularly with compounds containing litharge. It also reduces the "stability" of the vulcanized compound, the effects of over-curing being more marked than with untreated rubber. Throughout the tests it was noticeable that plantation smoked sheet rubber vulcanized faster than the air dried (pale) sheet, although in other respects both behaved similarly.

EXPORTING TO LATIN AMERICA. BY ERNST B. FILSINGER. D. Appleton & Co., New York City. [Large 8vo, 565 pages. Price \$3.]

To the importer—whether of rubber or of any other commodity—and more particularly to the exporter, this book is indispensable. It contains a vast fund of varied information essential in making a success of exporting to our neighbor republics to the southward. Written by a business man for business men, it dispenses facts rather than theories, and provides an intimate first-hand knowledge of the economic, social and commercial situation of each South and Central American country that will enable manufacturers in the United States to deal directly with their prospective customers. The resources, industries, needs and purchasing power of each are detailed; the business methods and characteristics of the Latin people are described, and former European export methods which have pleased them are discussed. Considerable space is devoted to tariffs, custom house regulations, packing, shipping routes and facilities, local agents and publicity, while the appendix constitutes in compact form a comprehensive encyclopedia of statistical and descriptive information, including an extensive bibliography of magazines, dictionaries, grammars and books devoted to travel and the principal industries. Intelligent classification and indexing makes any needed item available at a moment's notice.

Our readers will find this book of especial interest because rubber and rubber goods are so frequently mentioned. The author points out that although much of the crude rubber of the world comes from Brazil and Peru, manufactured articles of which rubber forms the basis are not produced in either country. As a consequence a splendid market exists for nearly every line of rubber goods in demand in the United States, particularly rubber footwear, raincoats and other waterproof clothing adapted to the climate, druggists' sundries, rubber and woven hose, tubing, sheeting and blankets, erasers, mats, life preservers, etc.

Manufactures are growing rapidly in South America and natural resources are being developed so that much rubber belting and insulated wire are being used. The adoption of the motor car in large cities for pleasure driving, parcel delivery and even freight handling, together with the increased building of improved country roads, are ever demanding more rubber tires. Games and sports are being introduced which insure an increasing need of tennis and golf balls, rubber-soled shoes and the like. Indeed, the rubber manufacturer, in whatever line, will find a considerable outlet for his product if he will but study this market and approach it in the right way. Until the war, Germany held a virtual monopoly of South American trade, chiefly because she made it a point to give these merchants what they wanted, carefully packed so as to arrive in perfect condition, prepaid to its destination and piloted through the custom

house by local agents so that the customer was freed of all annoyance. Our Latin neighbors are now of necessity turning to us, and it remains to be seen if we shall do as well. Such writers as Mr. Filsinger have pointed out the way, but the volume of trade we retain after peace is declared will be the measure of our success.

PARA RUBBER PLANTING IN MALAYA BY PIERRE DE BONDY, Ipoh, Perak, F.M.S. The Times of Malaya Press, Limited. [8vo, 1916, 190 pages.]

This volume consists of an estimate for opening 2,000 acres in five years together with an itemized statement of the total expenditure up to the seventeenth year inclusive, showing cost of rubber production and the profits based on rubber at 1s. 6d. per pound. According to the author's statement, capital will be required up to the seventh year to the extent of \$537,329, or \$268 per acre. The yield will begin the eighth year and net profits the tenth year (\$1402), and in increasing ratio thereafter until \$553,150, or 102 per cent is reached in the seventeenth year, the total profits up to that time being \$3,103,473, or 577 per cent. From the itemized yearly statements one gets an intimate knowledge of the various overhead and other expenses incident to rubber growing, the prevailing rates of payment, etc.

THE MOTORIST'S HANDBOOK ON VULCANIZING AND THE CARE of Tires. Harvey Frost & Co., Limited, London, England. [8vo, 56 pages, boards. Price, 1s.]

This concise yet comprehensive handbook deals with tire vulcanizing from the standpoint of the private motorist, particular attention being given to the care of tires which will reduce the necessity for vulcanizing to the minimum. The best treatments for punctures, nips, bursts and blow-outs in tubes are described minutely and well illustrated; also joining tubes, reseating valves and vulcanizing the seating. Casing repairs are gone into at considerable length, including the filling of cuts and vulcanizing of square tread covers, grooved covers, and studded covers. The treatment of loose treads and blisters is described and canvas defects and reinforcements are taken up in detail. Methods of patching with the aid of a steam mandrel are reviewed, also reversing the cover and replacing damaged canvas with new material. Vulcanization and inflation tables are given, together with description and prices of the leading British portable vulcanizers, mandrels and repair materials.

NEW TRADE PUBLICATIONS.

Any of the following publications will be supplied by those issuing them upon request.

ARTHUR JACKSON WILLS, North Brookfield, Massachusetts, manufacturer of special machinery for rubber work, sends a very attractive six-page folder descriptive of his specialties, such as overflow trimmer; carton erecting, filling and closing equipment; rubber edging plaiter, etc.

* * *

The Barber Asphalt Paving Co., Philadelphia, Pennsylvania, has recently published "The Good Roof Guide Book," which will be of interest to the many manufacturers of rubber goods now engaged in enlarging their plants. "Genasco Ready Roofing," with its layers of Trinidad lake asphalt between layers of burlap, wool felt and a surface of crushed quartz, possesses qualities of special value for use on factories, warehouses and storage sheds, which are convincingly described in this handsome pamphlet.

"The Circle" is the name of a bright and attractive monthly magazine published for and by the employes of The B. F. Goodrich Co., Akron, Ohio. Two concentric circles have been worked into the design on the title-page, the words "Employer—Public—Employee" occupying the space between them. This and the contents of the publication indicate clearly that the intention is to create a closer bond of friendship, better firm spirit and

team work. The news of the entire Goodrich organization, with numerous illustrations, forms the principal feature, although considerable attention is given to the problems of home life, athletics, and new books in the Goodrich library, not forgetting a goodly amount of brightening humor. The general program embraces fiction, biography, history, mechanics, economics and recreation, and every employe is encouraged to make helpful suggestions.

The live-wire publicity man of the American Chicle Co., New York City, is issuing at frequent intervals a large, illustrated news sheet called "Chicle-Chat." The Harvest Edition, September and October numbers combined, has the breezy character of energetic salesmanship and will interest everybody who sells chewing-gum. In addition to the general news of the trade and many personal items, nearly a page has been devoted to the interesting story of chewing-gum manufacture, from its origin as the milky juice of the Zapote tree, found chiefly in Mexico, to the finished product.

UNIQUE "M. R. X." ADVERTISING.

The Standard Emax Co., New York City, manufacturer of the hydrocarbon filler "M. R. X.," is distributing a unique advertising novelty. It consists of a rubber inkwell taking the form of a conical pile of tires of diminishing size surmounted by a stopper bearing a ball handle, the idea being to show the character of black rubber containing this well-known filler.

RUBBER TRADE INQUIRIES.

THE inquiries that follow have already been answered; nevertheless they are of interest, not only in showing the needs of the trade, but because of the possibility that additional information may be furnished by those who read them. The editor is therefore glad to have those interested communicate with him.

[237.] A correspondent requests names of rubberizing houses.

[238.] Information is sought concerning machinery for milling sheet rubber to uniform thickness.

[239.] Names of manufacturers of rubber sheeting for hospital use are requested.

[240.] An inquirer wishes to know how to compute the size of a casing and that of the corresponding tube.

[241.] Information is sought regarding the character and extent of purchases of manufactured goods, particularly farm implements and machinery, that an average rubber plantation would be likely to make.

TRADE OPPORTUNITIES FROM CONSULAR REPORTS.

An automobile garage proprietor in Venezuela desires the agency for American tires. Report No. 22,795.

Quotations are desired by a firm in Spain on medical and surgical rubber goods, rubber overshoes and raincoats, rubber heels, suspenders and fountain pens. Report No. 22,854.

A firm in Russia wishes to communicate with American manufacturers of garters. Report No. 22,874.

Representation of an American manufacturer of raincoats is sought by a merchant in Spain. Report No. 22,879.

Commercial relations are desired by a business house in Portugal with American manufacturers of rubber thread and thin rubber used in the manufacture of suspenders, garters, etc. Report No. 22,922.

A wholesale druggist in Spain wishes to import rubber articles. Report No. 22,975.

An import house in New Zealand desires to enter into commercial relations with American manufacturers and exporters of garden hose and rubber goods for household use. Report No. 23,044.

Interesting Letters from Our Readers.

FUTURE SUPPLY AND DEMAND IN CRUDE RUBBER.

TO THE EDITOR OF THE INDIA RUBBER WORLD:

DEAR SIR—The probable course of the rubber market after the war is becoming a source of diverse opinion among the trade. Until peace has been declared, the market will be extremely sensitive, but what of supply and demand after that?

Of course the former German and Austrian consumption of about 20,000 tons annually is offset by the needs of the American automobile tire industry, that has absorbed most of the increased output of crude rubber. The outcome of a return to normal conditions, however, will depend upon this production as compared with the logical increase of the world's consumption. Replenishing the exhausted supply of the Teutonic nations will cause only a temporary flurry. Cheap synthetic rubber does not promise to become a factor, although German chemists have been spurred to great efforts in this direction.

In an attempt to forecast future production and consumption several significant facts have been presented in Rickinson's monthly review of "The World's Rubber Position," and in "The Financial Times," London.

Regarding production, it is stated that the output of wild rubber from Brazil and elsewhere has been practically the same for several years and probably will remain so, but that the development of rubber plantations increased the world's output 31.8 per cent in 1915, while the increase for 1916 is estimated at 27.3 per cent. As no considerable areas have been planted since 1911, however, the belief is expressed that this rate of increase is not likely to be maintained. Although 214,000 acres were brought into bearing in 1911, it is pointed out that the total increase between now and 1920 will probably not exceed 377,000 acres, so that any greatly expanded output must be the result of increased production per acre. The average yield, I understand, is now 336 pounds per acre, and in 1920 it may have reached 400 to 450 pounds. This would insure a world's output of 300,000 to 330,000 tons, provided the wild rubber supply remains constant.

To forecast consumption appears to be far more difficult. During the past six years the average increase in the United States has been 24 per cent. Were that rate maintained there would be a serious rubber shortage in 1920; indeed, an increase in the world's demand of 20 per cent per annum would require 373,000 tons in 1920. While such a continued increase seems improbable, there is every indication that the growth of the motor car industry, the use of rubber for new purposes and the certain requirements of Europe after the war may render the expected increase from plantations during the next five years none too great to meet the world's requirements.

ANOTHER VIEW.

TO THE EDITOR OF THE INDIA RUBBER WORLD:

DEAR SIR—We believe it fair to assume that as the present plantation trees age, the girth being larger, the output of latex will increase in proportion, but when this yearly increased production ceases to be an important factor, we are not prepared to say, and, therefore, will not calculate any increase beyond 16 years of age, considering the output after this period at maximum. Therefore the following is based upon:

1st—Tree will reach its maximum output at 16 years of age.

2nd—No planting after 1915, other than enough to take care of such as may die, or be destroyed. The acreage January 1, 1916, being 1,377,000.

3rd—A fair average increased production yearly from the fourth year to the 16th, after which the output remains the same.

On this basis of calculation we secure the following production for the years indicated:

PLANTATION RUBBER.

Production.	Estimated.	Reported.	Under Estimated.	Over Estimated.
1900		4		
1901		5		
1902		8		
1903		1		
1904		43		
1905		145		
1906		516		
1907		1,000		
1908		1,800		
1909	4,950	3,600	1,350	
1910	10,302	8,200	2,102	
1911	21,350	14,419	6,931	
1912	33,510	28,518	4,992	
1913	48,374	47,681		
1914	70,182	71,380		1,198
1915	100,536	107,767		7,332
1916	132,962	150,000		17,038
1917	167,984			
1918	203,752			
1919	242,831			
1920	281,330			
1921	320,562			
1922	361,775			
1923	407,321			
1924	458,772			
1925	446,406			
1926	461,232			
1927	483,039			
1928	494,359			
1929	503,761			
1930	508,794			
1931	510,311			

The yearly increase progresses proportionately, but with a lessened percentage of increase each year up to 1931, when all trees planted prior to January 1 last, would reach their sixteenth year of maturity, and during which year the output would be 510,311 tons, after which the production would remain the same.

According to these figures there is ample crude gum in sight, and the riddle of the future appears to be on the consumer's side more than on the side of the producer, as it is hardly possible that the acreage under cultivation will not be increased beyond what it is at this time, to say nothing whatever about the increased latex from the trees as they reach a period beyond 16 years of age. In the above we have not included any wild rubbers, covering the plantation product only.

A LARGE RUBBER FIRM'S OPTIMISTIC OPINION.

TO THE EDITOR OF THE INDIA RUBBER WORLD:

DEAR SIR—So many industries are face to face with constantly decreasing supplies of raw material and ever increasing demands that the contrast afforded by the rubber business looms up vividly.

In 1905 uncultivated or "native" rubber comprised 60,800 tons, while in 1914 the production had dropped to 60,000 tons. But during the same period plantation rubber had risen from 145 to 64,000 tons. From the best available figures we estimate that while native rubber production will have fallen to 34,500 tons in 1917, plantation rubber will have reached 147,000 tons. By 1921 probably 209,000 tons of cultivated rubber will be available, while the supply of native rubber will have dropped to 30,000 tons.

When crude rubber reaches that level of cost which vastly increased supplies would indicate, myriad new uses will be added to those for which the present relatively limited production is

required. As ranches and open ranges become converted into farms, and the number of cattle decreases, lessening the supply of leather, while the population which must wear shoes and the factories which must have belting increase, rubber will step in more and more to furnish better service at even lower cost.

THE LARGEST HEVEA?

TO THE EDITOR OF THE INDIA RUBBER WORLD:

DEAR SIR—Passing through Shanghai last week, on the way home from the East Indies, a subscriber in the Chinese port lent me the September INDIA RUBBER WORLD, just received, in which there was, on page 652, the account and illustration of the



GIANT *Hevea Brasiliensis* IN CEYLON, GIRTH 10 FEET 4 INCHES.

largest *Ficus elastica* tree. Your readers may be interested to see a reproduction of the enclosed photograph that a friend took in Ceylon recently. I thought it was the biggest specimen of *Hevea Brasiliensis* in the Orient, but a fellow passenger on board, Director Edgar B. Davis, of the General Rubber Co., tells me there is one still greater at Mergui, Burma, 160 inches in circumference. This is about the size of the Rambong (*Ficus elastica*) that visitors are shown growing in the Plaza in front of the old cathedral in the Walled City, Intramuros, Manila.

The native caretaker, standing on the right of the picture, informed me that the Ceylon giant produced nearly 400 pounds of dry rubber in the five years ending with 1914, when tapping was stopped. The numerous seeds, however, are distributed abroad to planters who apply for them, and it is undoubtedly the parent and grandparent of some extensive estates. The photograph was made by William B. Daniel, nephew of C. A. Daniel, president of the Quaker City Rubber Co., Philadelphia, Pennsylvania.

RICHARD WEIL.

On board R. M. S. "Empress of Asia," October 14, 1916.

AN AMERICAN OPPORTUNITY IN RUSSIAN FOOTWEAR SCRAP.

TO THE EDITOR OF THE INDIA RUBBER WORLD:

DEAR SIR—No doubt you are aware of the fact that Russia is the greatest country for rubber shoes, and for that reason has been supplying more old shoes than any other nation. Until the war Germany and England were the biggest buyers of old rubber shoes, while the United States got only a trifling quantity that Russia exported.

Since the war broke out an embargo has been placed by the

Russian government on all rubber products, and also on old rubber shoes, which resulted in a very big accumulation of the latter in that country. We think, therefore, that now would be the right time for an American concern to buy up as much as possible of this stock, and have it stored away in Russia until after the war. The cost of storage would be insignificant in comparison to the gain in rate of exchange, the Russian ruble now being between 29 and 30 cents, whereas in normal times it was 51½ cents. RUSSIAN-AMERICAN AGENCY OF COMMERCE.

New York City, November 21, 1916.

JUDICIAL DECISION.

COHEN V. FIDLER & Co., ENGLAND. This suit to restrain infringement of the trade-mark "Regent" hinged upon whether its use upon waterproof garments known as "yarnproof" anticiated the subsequent use of the mark by another party upon rubberproof garments, the defendant maintaining that, as he had been the first to use the mark upon rubberproof goods, the plaintiff's prior use of it upon "yarnproof" goods would not enable the plaintiff to enjoin his continued use of the mark. It was held by the court that the goods were of the same descriptive properties, and that inasmuch as the defendant's adoption of the mark was with knowledge of the plaintiff's use and rights, he was not entitled to register his mark under the provisions of the trade-mark act, which permits the registration of an identical mark for more than one party, where there has been honest, concurrent use. [United States Trade-Mark Association Bulletin, October, 1916, page 263.]

DE LASKI & THROPP PATENT NO. 1,011,450 VALID.

In our November, 1916, issue, under Judicial Decisions, the De Laski & Thropp patent No. 1,011,450 for a tire wrapping machine was published as void. This was an unfortunate error in the records, which we are pleased to correct. The patent actually involved was No. 822,561, relating to a mold for vulcanizing tires.

GRANULATED CHICLE DUTIABLE AT 20 PER CENT.

The protest of G. W. Sheldon & Co., New York, claiming duty at 15 per cent ad valorem as "crude chicle," was recently overruled. The Board of General Appraisers held that chicle, imported in a granulated form, from which the moisture has been extracted, is advanced in value and is properly classifiable under paragraph 36, tariff act of 1913. This reads: "Chicle, crude, 15 cents per pound; refined or advanced in value by drying, straining, or any other process or treatment whatever beyond that essential to the proper packing, 20 cents per pound."

ASBESTOS IN ARIZONA.

Up to the present time Canada was the only locality in America where long fibered asbestos was obtained. While Wyoming produces asbestos, this material is of the serpentine type and is short fibered. Lately large deposits of the long fibered type of asbestos were discovered in Arizona, the largest deposits being in the Sierra Ancha and at Ash Creek. The asbestos of Arizona is chrysotile asbestos and is found in lime and diabase. Its nature makes it especially useful for the manufacture of fabrics. The high-grade material is at least 50 per cent of the total asbestos mined and is the only grade that is being shipped, due to the high freight. [Metallurgical & Chemical Journal.]

The Canfield Rubber Co. of Bridgeport, Connecticut, was granted a drawback allowance early last month on the exportation of dress shields, infants' specialties, diapers and bibs, with the use of imported galloon binding, Japanese silk, lace trimming, beading, frilled webbing, tape and drawing strings.

The Obituary Record.

THE DEAN OF FIRE HOSE SALESMEN.

ISAAC BELKNAP MARKEY, vice-president of the Eureka Fire Hose Manufacturing Co., Jersey City, New Jersey, died at his residence in Brooklyn, New York, November 7, aged 83

New York and New England when Robert D. Evans traveled in the western states. Upon Mr. Evans' retirement from the firm of C. H. Clapp & Co., Mr. Silliman secured an interest, and when the firm went out of business he associated himself with the



F. S. SILLIMAN.



I. B. MARKEY.



PHILIP BRAENDER

years. Mr. Markey was born in Little Britain, New York, and for the last 45 years was actively connected with the fire hose industry, most of this time with the above-named company. For 25 years he was a traveling salesman, visiting every part of the country, and becoming intimately acquainted with city officials, and fire department chiefs. During his business life he saw many important changes in the fire hose trade, including the evolution from leather hose to copper riveted linen hose, and then to the tubular woven, rubber-lined linen hose of today.

Mr. Markey was a familiar figure at the conventions of the International Association of Fire Engineers, attending every convention of that body since 1873, and the appreciation in which he was held was evidenced by the presentation to him, a few years ago, of a beautiful diamond-studded badge of that association. He was familiarly known as "Uncle Ike" by his many friends and associates. Mr. Markey was a member of several Masonic bodies, a life member of Mecca Temple, a member of the Independent Order of Elks, and of the Machinery Club.

He leaves a widow, two sons and three daughters.

WELL-KNOWN VETERAN RUBBER SALESMAN.

Francis F. Silliman, for many years a salesman in the rubber business, died at his residence in Malden, Massachusetts, November 14, aged 81 years.

He was born in East Haddam, Connecticut, and on completing his education entered the factory of the Hayward Rubber Co., at Colchester, Connecticut, where he learned the trade of making rubber boots. With several others he went to Malden when E. S. Converse organized the Boston Rubber Shoe Co. In the early sixties he was sent by C. M. Clapp & Co. to Cincinnati to straighten out some trouble over a government contract, and soon after became salesman for that firm, then handling the goods of the National India Rubber Co. at Bristol. He covered

Cable Rubber Co., retiring from business about five years ago because of old age.

Mr. Silliman was a member of the Malden Common Council for several years, and in 1885 and 1886 was an alderman. He was a member of Mt. Vernon Lodge of Masons and Hugh de Payens Commandery of Knights Templars, a trustee of the Malden Savings Bank, and for many years a member of the First Baptist Church in that city. He is survived by his widow and one son, Edwin B. Silliman, western salesman for the American Rubber Co.

A PROMINENT TIRE MANUFACTURER.

Philip Braender, president of the Braender Rubber & Tire Co., Rutherford, New Jersey, passed away at his home in White Plains, New York, November 4. Mr. Braender was born in Germany in 1849, and at the age of 16 came to America where he entered the real estate and building business in New York City. Some of his best-known buildings are the Braender Apartment House and the Ashland Building, the latter being on the site of the old Ashland House.

While still maintaining his active connection with the prominent New York firm of contractors and builders bearing his name, he entered the rubber business in 1911 in conjunction with the late Frank McGowan under the firm name of Cable Pneumatic Tire Co., and later in 1912 took over this interest under the present name and associated with him the late G. Strauss, formerly with the Goodyear Rubber Co. in the manufacture of bicycle tires.

Mr. Braender was also president of the Braender Building & Construction Co., of New York, a member of the Arion Society of New York and Teutonia Lodge No. 617 A. F. & A. M. He leaves a widow, and four sons connected with the company. His estate of \$1,000,000 is divided among the members of his family.

The Rubber Cargo of the "Deutschland"

OUR highly esteemed contemporary "Le Caoutchouc & la Gutta-Percha," under date of September 17, publishes the following:

If we are to believe information coming from the United States, the famous German commercial submersible boat "Deutschland" has left Baltimore with a cargo made up chiefly of rubber.

This exportation of rubber is going to put in a rather peculiar position the Rubber Club of America, of which Mr. Firestone is now president, and which has pledged itself to the British Government—to which now belongs the control of rubber—that none of the rubber imported into the United States will be re-exported to the "Central Empires."

It is under this express condition that Great Britain allows the supplying of the United States with rubber and it is this express condition that has been outrageously violated in the case of the "Deutschland."

It is quite evident that there are in America a sufficient number of pro-German concerns, and even of unscrupulous merchants, who, in the presence of an opportunity for exceptional profit, would not hesitate to violate a solemn pledge and to furnish to the captain of the "Deutschland" all the rubber he could take away. Nevertheless, the responsibility of the Rubber Club is engaged, and we are curious to know what measures the British Government will take concerning it.

Will it (the British Government) stop imports for a few weeks? With a consumption that will exceed 100,000 tons this year, our good Yankees would be slightly famished, but they would learn to know that pledges must be respected.

(D).

While acknowledging the consistent fairness of "La Caoutchouc & la Gutta-Percha," we still feel that there are many circumstances of which they are not cognizant, else the above would not have been written. The Rubber Club of America, Inc., of which Mr. Firestone is the president, has not "pledged itself to the British Government that no rubber imported into the United States would be exported to the Central Empires": first, because no such pledge was ever demanded or exacted by Great Britain; and second, because the Rubber Club was in no position to pledge itself to a demand of that character. The Rubber Club from time to time adopted the practice of explaining to individual rubber manufacturers and importers the terms upon which they could secure the release of rubber from the British Government as laid down by their rules and regulations. As for the rubber that went to Germany on the "Deutschland," it was sold by one who had signed an individual guaranty and thereafter violated its terms, and over whom, manifestly, the Rubber Club should have had no control. The shipment of rubber, as nearly as can be known, amounted to about 100 tons. Actually it was about one-tenth of one per cent of the rubber that had come into the United States since the embargo was lifted and guaranties exacted.

Although our contemporary has not yet mentioned it, it is probable that further feeling will be developed by the second "Deutschland" cargo, now on its way to Germany. This is also a little over 100 tons of rubber, but it is rubber that was bought in the Dutch East Indies, by parties not connected with the American rubber trade, either as importers or manufacturers, and was a transaction which involved no guaranty and for which the American rubber trade or The Rubber Club of America, Inc., are in no way responsible. In other words, American rubber importers and manufacturers individually have lived up to their guaranties with wonderful unity and good faith and we have no doubt that "La Caoutchouc & la Gutta-Percha," now the facts are made apparent, will frankly admit it.

RUBBER CLUB ANNOUNCEMENTS.

IN ADDITION to the prominent speakers that were mentioned in the November issue of THE INDIA RUBBER WORLD, Bishop Frank Du Moulin, Bishop Coadjutor of Ohio, will address the Rubber Club at the annual banquet to be held in New York City January 8 in the grand ball room of the Waldorf-Astoria. Many prominent men of national reputation have been invited to attend, including the President and Vice-President of the United States; the Governor of the State of New York and the Mayor of New York City; the chairman of the Federal Trade Commission and several ministers and ambassadors of European and South American countries.

A new and pleasing tribute to the ladies will be the reservation of the boxes surrounding the ball room for their use after the banquet, when the speeches will be made.

RUBBER CLUB EXECUTIVE COMMITTEE MEETING.

The executive committee of The Rubber Club of America, Inc., held a meeting November 20, at the Whitehall Club, 17 Battery Place, New York City. Messrs. Firestone, Hodgman, Cartwell, Bruyn and Pearson were present. The usual routine business was transacted, two firm members dropped for non-payment of dues and the resignation of F. G. Burgess, Hodgman Rubber Co., Boston, Massachusetts, was accepted. The following firm and associate members were elected:

FIRM MEMBERS.

New York Insulated Wire Co., New York City.
Representative, L. O. Brewster.
Mitsui & Co., Ltd., New York City.
Representative, Tamotsu Nagano or Sadatka Tishima.
The Goodyear Rubber Insulating Co., New York City.
Representative, H. C. Green.
W. H. Whittaker & Co., New York City.
Representative, Samuel H. Clark.
J. Spencer Turner Co., New York City.
Representative, John E. Rousmaniere.
The Whitney Blahr Co., New Haven, Connecticut.
Representative, M. E. Chester.
Victor Balata and Textile Belting Co., Brooklyn, New York.
Representative Charles E. Aaron.

ASSOCIATE MEMBERS.

United States Rubber Co., New York City.
Representative, Ralph W. Ashcroft.

THE SPRECKLES RUBBER PLANTATION.

John D. Spreckles, of sugar fame, is also president of the Savage Tire Corporation, San Diego, California. As tropical plantations are no new venture to him, he has lately acquired large rubber plantations in Java—another bit of American forehandedness.

The North British Rubber Co., Limited, Castle Mills, Edinburgh, Scotland, informs us through its Canadian branch that a man giving the name of Mr. McKenzie is falsely representing himself as being in the employ of the company. The coöperation of the trade is requested in arresting this man, and any information that would assist in locating him should be addressed to The North British Rubber Co., Limited, 43 Colborne street, Toronto, Canada.

News of the American Rubber Trade.

PENNSYLVANIA RUBBER CO. APPOINTS SALES DIRECTORS.

GENERAL Manager Lewis of the Pennsylvania Rubber Co., Jeannette, Pennsylvania, announces that in order to give more personal attention to the business in various sections of the country it has been decided to establish districts, each under a sales director. The following appointments have been made: G. C. McCullough, eastern territory; D. D. F. Yard, southern district, James Q. Goudie, central states; C. F. Kent, the West; James F. Madden, Pacific Coast. Vice-president Charles M. DuPuy, who, established the branches in both Pittsburgh and Philadelphia, will, as heretofore, take personal charge of the Pennsylvania district.

BUILDING ACTIVITIES OF BUFFALO FOUNDRY & MACHINE CO.

The Buffalo Foundry & Machine Co., Buffalo, New York, is in a continuous state of expansion. A new steel shelf shop, 34 by 110 feet, recently completed, will contain, exclusively, steel shelves for the company's vacuum dryers. This building is of structural steel with steel sash and asbestos-covered corrugated steel and in connection with it a Kuhn steel storage shed, 28 by 58 feet, is also being erected.

Bids are being received for a new testing laboratory, 75 by 90 feet, of brick and concrete, which will contain a chemical and physical laboratory for the chemist of the foundry and the chemist and testing engineer employed in connection with the vacuum drying business of the company.

A brick and concrete addition to the present pattern storage building is also planned, which will double the capacity of this storage.

NEW JERSEY CAR SPRING & RUBBER CO. APPOINTMENTS.

The New Jersey Car Spring & Rubber Co., Jersey City, New Jersey, announces that, following the resignation of S. P. Woodward from his position as general and sales manager, J. W. Paul will act as sales manager of mechanical goods and L. K. Rittenhouse as sales manager of the tire department. Mr. Paul has been associated with the company for some time past as assistant sales manager, having formerly been manager of the Pittsburgh (Pennsylvania) branch of the Diamond Rubber Co. Mr. Rittenhouse was recently connected with the Norwalk Tire & Rubber Co., previous to which he was, for about ten years, associated with the interests of the Diamond and Goodrich companies as district manager at Boston, Massachusetts, and St. Louis, Missouri.

MAGMETCO CRIMSON AND GOLDEN ANTIMONY.

The Magnolia Metal Co., 115 Bank street, New York City, manufacturer of the well-known Magnolia babbitt metal, is now manufacturing both crimson and golden sulphuret of antimony for the rubber trade. These products are known as Magmetco brand, 15/17 per cent, and have no free sulphur. The St. George Chemical Co., 99 John street, New York City, is sole selling agent for the United States and Canada.

The Barrett Co., 17 Battery place, New York City, is manufacturing a high grade solvent naphtha suitable for the rubber trade. It is a coal tar distillate of exceptional solvent power. Color, water white; distillation, approximately 5 per cent at 130 degrees C. and 90 per cent at 160 degrees C. The evaporation is slightly faster than turpentine and the flash point about 78 degrees F.

The F. S. Carr Rubber Co. of Canada, Limited, manufacturer of "Victor" rubber heels, mechanical rubber goods and automobile fabrics, has disposed of its business to the Miner Rubber Co., Limited, Granby, Quebec, which will continue to manufacture the same lines of goods, including its own.

THE RAYBESTOS CO.

The Raybestos Co. has been incorporated under the state laws of Connecticut for \$1,500,000 and will take over the Royal Equipment Co., manufacturer and distributor of Raybestos brake lining, brakes, compressed asbestos sheet packing, etc.

A 15-acre factory site has been purchased along the railroad at Bridgeport, Connecticut, and new buildings will be erected which will double the capacity of the present plant. The single-unit type of construction will be used throughout all the buildings, and plans and specifications have been finished for the following additions: Two buildings of concrete and steel, each 100 by 600 feet, to be used for the weaving of brake lining; one building, 100 by 200 feet, for the manufacture of brakes; one, 60 by 200 feet, for the treating of Raybestos; one, 60 by 300 feet, for manufacturing compressed sheet, and one, 60 by 300 feet, for the storehouse and shipping department. A power house and office building will also be erected.

The yearly production of Raybestos brake lining is now 15,000,000 feet, and of compressed asbestos sheet packing, 1,000,000 pounds.

SAFETY FIRST FACTORY SIGNS.

"Safety First" has become a slogan of great significance in all manufacturing plants. The management of the Republic Rubber Co., Youngstown, Ohio, believes in warning workmen to be careful. Signs are placed in various parts of the plant adjuring the employes to use care and caution. Fire boxes are distributed at many points through the premises, and signs are placed pointing the way to the nearest one. A significant sign tells the possible effects of a fire, others placed on stairs admonish employes to go slowly to prevent crushes, while still others illustrate the effective way in which an effort is being made to instil in the minds of the workmen the advantages of care and caution for health, safety and prosperity.

RUBBER COMPANY DIVIDENDS.

The Federal Rubber Co. paid the regular dividend of \$1.75 per share on second preferred stock on November 25.

The directors of the Plymouth Rubber Co. have declared the regular quarterly dividend of 1¾ per cent on preferred stock, payable December 1.

The Ajax Rubber Co., Inc., has declared a quarterly dividend of \$1.25 per share, payable December 15 to stockholders of record November 29.

RUBBER COMPANY SHARE QUOTATIONS.

The following market quotations of shares of rubber manufacturing companies on November 25, are furnished by John Burnham & Co., 115 Broadway, New York City, and 41 South La Salle street, Chicago, Illinois:

	Bid.	Asked.
A. S. Rubber Co., common.....	70	72
Federal Tire & Rubber Co., new, common.....	168	171
Federal Tire & Rubber Co., preferred.....	166	168
The B. F. Goodrich Co., common.....	70½	71
The B. F. Goodrich Co., preferred.....	120	123
Goodyear Tire & Rubber Co., common.....	294	297
Goodyear Tire & Rubber Co., preferred.....	108	110½
Kelly-Springfield Tire Co., common.....	76	77½
Kelly-Springfield Tire Co., 1st preferred.....	96	99½
Miller Rubber Co., common.....	255	260
Miller Rubber Co., preferred.....	107	108
Portage Rubber Co.....	165	170
Rubber Co. of Canada, Limited.....	8	8
St. George Chemical Co.....	8	8
U. S. Rubber Co., common.....	65¾	66¼
U. S. Rubber Co., preferred.....	112¼	113

TRADE NOTES.

The business of G. E. Thing & Co., Buffalo, New York, has been acquired by the United States Rubber Co., of New York City, and will be continued as a branch store of that company, under the same name as formerly, with J. F. Barnes as manager.

The Orrville Rubber Co., Orrville, Ohio, notice of whose incorporation appeared in the November issue of THE INDIA RUBBER WORLD, has begun operations with newly purchased machinery that will insure an output of 360 tires per day. The company will manufacture inner tubes and tires, specializing in Ford sizes, and about January 1 will commence to manufacture heels, soles and rubber matting.

The Panama Rubber & Equipment Co., St. Louis, Missouri, has increased its capital stock to \$30,000. This company has recently added to its automobile business a lighting and starting battery station, managed by H. E. Spoeneman, who has become a member of the firm.

Rosenwald & Weil, Chicago, Illinois, have more than doubled their rubberizing capacity within the past year and have recently contracted to produce 1,000,000 yards of auto-top combining work. This concern is now running a new 66-inch, three-roll Farrel calender, and in order to secure the proper control over the variable speeds, a transformer and rotary converter has been installed in connection with a Cutler-Hammer control board.

This firm recently held an extensive exhibit at their sample rooms for the information of raincoat buyers. Crude rubbers of various kinds were shown, together with bottles or jars of compounding ingredients, each properly labeled. With these were displayed samples of the fabrics before and after sheeting, all appropriately labeled. The exhibit elicited much favorable comment from the buyers.

The entire plant of the Atlantic Manufacturing Co., mechanical rubber goods, at Wilmington, Delaware, was consumed by fire on November 7. It is said that the plant will at once be rebuilt.

The Barrett Co., Philadelphia, Pennsylvania, a large manufacturer of chemicals and compounding ingredients used in the rubber trade, specializing in benzol, will build a one-story brick and concrete boiler plant on Bermuda street.

The United States Rubber Co. of California, will occupy a new \$10,000 building now in course of construction at 731 Broadway, Tacoma, Washington. The new quarters will be 40 by 100 feet, three stories high.

The New York City offices of Werner & Pfleiderer Co., of Saginaw, Michigan, are now located on the thirty-seventh floor of the Woolworth Building.

The capital stock of the Portland Rubber Mills, of Portland, Oregon, has been increased from \$25,000 to \$40,000, according to an announcement made by H. C. Huntington, president and general manager of the mills. The company specializes in molded goods.

It is reported that Robert H. Childs, superintendent of the Asphalt & Rubber Co., Independence, Kansas, has resigned and will be succeeded by J. H. Harre, of Chicago, Illinois.

The recent annual meeting of the Electric Hose & Rubber Co., Wilmington, Delaware, showed a gross business of \$1,468,000, as compared with \$991,000 during the preceding year. Total dividends for the year amounted to 15 per cent.

The new mechanical rubber goods manufacturing company located at Goshen, Indiana, will be known as The Goshen Rubber & Manufacturing Co. The new company was incorporated with a capital of \$55,000 and its officers are Charles Noel, president, general manager and treasurer, and Henry W. Pease, secretary, sales manager and superintendent.

Large additions are being made to the La Crosse Rubber Mills, La Crosse, Wisconsin. Present plans embrace a largely increased force and output of rubber boots and shoes.

The Meade Rubber Co., Stoughton, Massachusetts, manufacturer of molded specialties, is working its factory day and night and is unable to keep abreast of orders.

The United States Rubber Co., Lycoming, Pennsylvania, will erect a four-story addition to its plant costing \$40,000. The completion of this will allow for an increase in force of 500 to 1,200 persons, and in production to 20,000 pairs of shoes daily.

PERSONAL MENTION.

The whole trade will hear with much regret of the accident that happened to Robert B. Baird, vice-president of the Rubber Trading Co., on the 14th of November. Mr. Baird, in crossing lower Broadway, New York City, was struck by a car and badly crushed under the fender. He was taken to the Seeneey Hospital in Brooklyn, where he has remained in an unconscious condition most of the time since. His injuries seem to be shock and a slight concussion of the brain. The physicians in attendance report that his condition is very serious.

Marcus Rothschild, who has been connected with the Rubber Trading Co., New York City, since its organization, has commenced business on his own account as a crude rubber broker, with offices at 23 Beaver street, New York City.

Captain Ernest E. Buckleton, president of the Northwestern Rubber Co., Litherland, Liverpool, England, has recently been visiting his many friends in the United States and Canada. Captain Buckleton is hale, hearty and optimistic as usual, and if he returns to England early in December, as he now plans, the American rubber trade heartily wishes him *bon voyage*.

Frederick C. Peck, author of "The Valuation of Rubber Estates" and "Malayan Dollar Companies," and late director of The Mergui Rubber Estates, Limited, Lower Burma, passed through New York last month *en route* to England. He reports a very bright future for the Eastern planting industry.

Edgar B. Davis and H. Stuart Hotchkiss have returned from Sumatra, where they inspected the plantations of the General Rubber Co., of New York City.

J. M. S. Carroll, manager Quebec division Canadian Consolidated Rubber Co., Limited, has been elected by acclamation a director on the board of management of the Dominion Commercial Travellers' Association, to hold office for the years 1917-1918.

W. F. Bowers, founder of the Bowers Rubber Works, San Francisco, California, was a recent visitor at the offices of THE INDIA RUBBER WORLD in New York City. His interests, by the way, in the very successful company that he built up, he sold to his partner, W. R. Johnson.

Leon A. Mainetty has brought suit against George Philips Neider, a New York export merchant, alleging that Neider caused his name to be placed on the British blacklist by inducing him to ship contraband rubber in coffee bags.

"TAPERED" RUBBER WASHERS.

A rubber washer is a simple thing, usually a piece of sheet rubber cut to the shape and size intended. It performs its work well under ordinary circumstances. But if the seat against



which it rests be worn or uneven, the washer must be subjected to unusual grinding pressure to secure the necessary tightness, and its early destruction results. A washer that will be fully as effective where the connections are perfect, and much more so where the above-named defects are manifest, has a somewhat spherical surface on one side—a sort of rounded taper. This shape allows the taper to fit uneven surfaces more closely. These washers are made of a flexible compound that renders them more durable and efficient. [The Durst Manufacturing Co., Inc., New York City.]

F. E. PARTRIDGE HEADS NEW RUBBER FIRM IN CANADA.

F. E. PARTRIDGE, president of the recently established rubber manufacturing corporation bearing his name, has been identified with the rubber industry for over 20 years. He started



F. E. PARTRIDGE.

in 1894 with the Maynard Rubber Co., Claremont, New Hampshire, and rose step by step to the position of superintendent. From there he went to the Boston Woven Hose and Rubber Co., Cambridge, Massachusetts, as night superintendent. His next step was to the superintendency of the plant of the Combination Rubber Co., Bloomfield, New Jersey. Later he was called to the

Canadian Rubber Co., Montreal, Canada, where he was made vice-president, and given the management of the production of all goods made by that company, with the exception of footwear.

Early in 1915 Mr. Partridge formed a partnership with Vincent Cooke for the purpose of manufacturing druggists' sundries and inner tubes, and worked up business to such an extent as to demand a much larger plant. At the opportune moment, the Independent Rubber Co., Merriton, Ontario, Canada, discontinued business, and the plant, valued at \$175,000, was leased by the F. E. Partridge Rubber Co. for a term of years, with an option to purchase on advantageous terms.

A new company was formed, with headquarters at Guelph, Ontario, Canada, under the above corporate name, with a capital of \$125,000. Mr. Partridge is president and general manager. Associated with him are Vincent Cooke, vice-president, and F. M. Ker, secretary and treasurer. The factory is now turning out tires and tubes, hot water bottles, and a varied line of druggists' sundries, while alterations are being made and extra equipment installed to enlarge further the variety and quantity of the output.

BERGOUGNAN TIRE CORPORATION.

After December 11, 1916, the Gaulois Tire Corporation, 49 West Sixty-fourth street, New York City, American sales agents for Établissements Bergougnan, Clermont-Ferrand, France, will change its name to Bergougnan Tire Corporation. J. Grenier will continue as vice-president and general manager.

NEW CANADIAN TIRE COMPANY.

The Sterns Tire & Tube Co. of Canada, Limited, has been formed with an authorized capital of \$1,000,000, and will locate at Windsor, Ontario, with a one-story factory, 100 by 150 feet. The officers of the company include N. J. Morrissey, Pickering, Ontario, president; Edward Sterns, St. Louis, Missouri, director and consulting engineer; C. J. Gibson and A. S. Chapin, Toronto, directors; E. M. Carruthers, Toronto, secretary and treasurer.

PERSONAL MENTION.

Carl P. Cartmell will handle the sales of Kelly-Springfield tires in the Buffalo (New York) territory for the Kelly-Springfield Tire Co., New York City. Mr. Cartmell was formerly treasurer and purchasing agent for the Victor Rubber Co., Springfield, Ohio, but has disposed of his interest in that company.

A. L. Edwards, son of George D. Edwards, notice of whose death appeared in the November issue of THE INDIA RUBBER WORLD, has succeeded his late father as manager of the Detroit (Michigan) branch of the Kelly-Springfield Tire Co.

J. P. Carney, for the past 20 years associated with the Portland (Oregon) branch of the Goodyear Tire & Rubber Co., has now joined the forces of the Imperial Belting Co., of Chicago, Illinois, having charge of the Northwest territory of the latter company, with headquarters in Portland.

Horace De Lisser, chairman of the board of directors of the Ajax Rubber Co., New York City, recently went to Cuba for a several weeks' trip combining business and pleasure.

Leland J. Sparks has been appointed manager of the Portland (Oregon) branch of the Firestone Tire & Rubber Co., having formerly been connected with the branch at San Francisco, California.

William L. Burgess has been appointed sales manager of the Sterns Tire & Tube Co., St. Louis, Missouri. For the past two years Mr. Burgess was general sales manager of the Dorris Motor Car Co. and prior to that had charge of the sales of the rim department of the Firestone Tire & Rubber Co.

H. S. Wheeler has succeeded H. T. Richards as manager of the Memphis (Tennessee) depot of the B. F. Goodrich Co.

A. E. Hertzog, manager of the Baltimore branch of the Goodyear Tire & Rubber Co., Akron, Ohio, has been appointed manager of the Washington branch of the company and will take care of the territory in both sections. L. J. Gemmil, who was manager of the Washington branch, will look after all of the government business exclusively.

S. P. Woodard is now president of the Gillette Safety Tire Co., Eau Claire, Wisconsin, and will have offices in New York City.

It was recently announced that Ralph C. Ridge, former superintendent of the Marathon Tire & Rubber Co., Cuyahoga Falls, Ohio, has succeeded C. F. Pickton as superintendent of the Porter Rubber Co., of Salem, Ohio.

Fred E. Boylan has resigned as Detroit manager of the Swinehart Tire & Rubber Co., Akron, Ohio, to become factory representative of the Sewell Cushion Wheel Co., Detroit, Michigan.

EXPANSION OF THE EAST PALESTINE RUBBER CO.

The East Palestine Rubber Co., Pittsburgh, Pennsylvania, with a factory at East Palestine, Ohio, has acquired additional property of about 12 acres, adjoining the present plant and lying directly upon the main line of the Pennsylvania Railroad, with a railroad frontage of 1,800 feet. This land has been purchased for enlargements and additions to be erected in the immediate future. These improvements will be of single unit type, one story, saw tooth, brick, steel and glass construction. The buildings are to be equipped with the latest type of tire and tube making machinery and will quadruple the present manufacturing capacity.

On completion of the first unit, the construction of the company's "Nabob" tire will be changed from the wrapped tread to the full mold type, but the tire will remain a strictly hand-made product. As soon as the necessary special equipment is obtained, the company also intends to manufacture a cord tire.

TRADE NOTES.

The Rubber Tire & Rubber Co. of New England has changed its name to Interstate Rubber Co. and has removed its Boston (Massachusetts) office to 392-394 Newbury street. This change of name was considered advisable by the stockholders because the company distributes more than one brand of automobile tires.

The Armstrong Rubber Co., Inc., having removed its factory to 118-122 Adams street, Newark, has discontinued its corporation in the State of New York and incorporated in the State of New Jersey for the same amount, \$200,000. This company manufactures the well-known Armstrong tube equipped with the Kahn automatic valve.

The F. E. Partridge Co., Limited, notice of whose incorporation appears elsewhere in this issue, has taken over the plant and equipment of the Standard Tire & Rubber Co. of Guelph, Ontario, on a five-year lease, with option of purchase at any time before its termination. The head office of the Partridge company has been moved to Guelph and orders taxing the full capacity of the plant have already been secured. The output consists of high-grade tires, tubes, and druggists' sundries.

The Fisk Rubber Co., Chicopee Falls, Massachusetts, has begun the erection of a boiler plant, 125 by 300 feet, which will include, besides the boiler house, a railroad trestle, coal crusher, automatic conveyors and feeders, with other auxiliary apparatus. The first installation will consist of five 760-horse-power boilers. The building will provide steam and hot water for manufacturing purposes throughout the 20 buildings of the company, and the cost of the entire project will be over \$200,000.

Charles F. U. Kelly, president of the Kelly-Field Co., the selling corporation for the Lee Tire & Rubber Co., of Conshohocken, Pennsylvania, has sold his entire interests to Harry E. Field, who has been vice-president and treasurer, and who now becomes president of the company. The business will be continued unchanged except that even closer relations with the factory will be established and a considerable addition made to the selling forces to care for the increased production that is planned for the coming year. Mr. Kelly has not yet announced his future plans.

The East Palestine Rubber Co., East Palestine, Ohio, has increased its capital from \$500,000 to \$1,000,000.

The Connecticut Mills Co. is building a 400-foot, four-story addition to its weaving mill at Danielson, which will make the mill 850 feet in length. A model village is also being erected, and around the mill proper is an exceptionally fine park with extensive lawns, shaded drives and beautiful gardens. The spinning plant of this company is at Taunton, Massachusetts. R. J. Caldwell Co., Inc., 15 Park Row, New York City, is the selling agent.

The Standard Tire & Rubber Manufacturing Co., with offices in Cleveland, Ohio, and factory at Willoughby, Ohio, has completed material additions in floor space and equipment to take care of increased production. About six months ago this company was producing 50 tires a day, but this output has been increased to 200 a day, and the present expansion has been made in order at least to double that capacity.

The Standard Four Tire Co., Keokuk, Iowa, has increased its capital stock from \$240,000 to \$340,000, \$300,000 being preferred and \$40,000 common stock.

The Sheldon Tire Co., Buffalo, New York, notice of whose incorporation appears elsewhere in this issue, was organized to succeed the Quality Tire Co., which is the agency for Hood tires in western New York.

The Hydraulic Press Manufacturing Co., Mount Gilead, Ohio, has recently received an order for 70 hydraulic vulcanizing presses of 115-ton rating from the Goodyear Tire &

Rubber Co., Akron, Ohio. All of the presses are of one design and will be operated from the hydraulic pump and accumulator systems already installed.

The Crown Tire & Rubber Co., recently incorporated for \$250,000, will locate in Omaha, Nebraska, and will specialize in Crown Cord tires for automobiles and motorcycles. Other lines of rubber goods will also be made. The company is said to have acquired five acres of ground for the projected plant, which will comprise six large factory buildings, when completed.

The Luck Tire & Rubber Co. is a new enterprise expected to locate in Hillsdale, Michigan. It is stated that C. J. Davis, of the National Tire & Rubber Co., East Palestine, Ohio, will be manager of the new plant.

In support of their statement that Dann Inserts between the leaves of automobile springs will promote appreciably the life of automobile tires, the Poehlmann Automobile Supply Co., Baltimore, Maryland, offers to add 1,500 miles to the mileage guaranty offered by the tire manufacturer. To obtain the benefit of this arrangement, the automobile owner has only to register with the Poehlmann Co. any new tires which he places on a car equipped with the inserts.

The McGraw Tire & Rubber Co., East Palestine, Ohio, recently turned out 5,324 tires in one day. It is expected that with the installation of certain machinery this figure will soon be greatly exceeded.

Work has been resumed on the Pearce Tire & Rubber Co., Ashtabula, Ohio. It is stated that Cleveland capital has recently become interested in the project.

The Good-Wear Tire Co., which seemed likely to locate in Lorain, Ohio, has decided to operate in Elyria, Ohio, and to that end has purchased a factory in that city.

The Firestone Tire & Rubber Co. contemplates a branch house in Wichita, Kansas.

The Germantown Pennsylvania factory of the Pearce-Arrow Tire & Rubber Manufacturing Co. is turning out a pneumatic tire with a claimed mileage capacity test of 10,000 to 12,000 miles. This company puts out the Pearce "custom-made" 4,200-mile guaranty tire.

The Boone Tire & Rubber Co. will locate at Sycamore, Illinois. The company is expected to be in operation in February.

The V. K. Sturgis factory, at Oakland, California, has taken the operating name of the National Rubber Co. It is said this company will employ 100 men.

The Achilles Rubber & Tire Co., notice of whose incorporation appears elsewhere in this issue, has recently purchased a factory site in Binghamton, New York. The company purposes to manufacture tires.

The Knight Tire & Rubber Co., Canton, Ohio, has been absorbed by the Fabricord Tire Co., which is being formed for the purpose of welding into one great organization several rubber manufacturing units. N. W. McLeod, of St. Louis, Missouri, is president of the Fabricord company, and particular attention will be devoted to the production of cord tires under the McLeod patents. It is said that capitalists of New York, Chicago and St. Louis are interested.

THE BIG FOUR TIRE & RUBBER CO.

The present factory at Berea, Ohio, of the Big Four Tire & Rubber Co., notice of whose incorporation appears elsewhere in this issue, has 18,000 feet of floor space and is situated on a 5½-acre tract of land.

The company is now selecting a site in Cleveland, Ohio, for a new factory, and in the near future will erect there a concrete building 400 feet long by 80 feet wide, three stories and basement. While tires will be the main output, a general line of rubber products will also be manufactured.

KELLY-SPRINGFIELD PLANS FOR CUMBERLAND PLANT.

The future location of the Kelly-Springfield Tire Co., in Cumberland, Maryland, is now an established fact, a site for the new plant having been acquired on a 74-acre tract of land. The factory will be of four-story wing construction, thoroughly modern in every respect, facilities of the most approved sort being provided both as to manufacture and welfare of workers.

A \$500,000 bond issue, voted by the city of Cumberland, provides for necessary civic improvements in the section where the plant is to be located. The Kelly-Springfield company in turn agrees to erect a plant costing at least \$1,500,000, and within two years after it is in full operation to employ at least 3,000 persons. Within one year after full completion of the Cumberland factory, the Kelly-Springfield company will discontinue all other plants and concentrate its entire manufacturing business in Cumberland.

A CHANGE OF NAME.

At a stockholders' meeting of the Vail Rubber Co., November 2, the name of the corporation was changed to Ehman Tire & Rubber Co. The Ehman company will continue to manufacture and sell pneumatic tires for automobiles and accessories to the tire lines, also mechanical rubber goods. Considerable additional equipment is now being installed to take care of rapidly increasing demands.

GORDON TIRE PROGRESS.

The new storehouse and shipping room now under construction for the Gordon Tire & Rubber Co., Canton, Ohio, will relieve 6,000 square feet of space in the mill room, thereby increasing efficiency and output considerably.

Several changes in the personnel of the operating-department also indicate the rapid expansion of the business. C. W. McKone, chief chemist of the Ajax Rubber Co., Trenton, New Jersey, will hereafter be mill room superintendent. E. R. Neubauer, of the Star Rubber Co., Akron, Ohio, has been appointed manager of sales of the druggists' sundries department, and E. R. Palmer, of the American Tire & Rubber Co., Mansfield, Ohio, has assumed the duties of chief of the cost department.

HYDRAULIC PRESS MANUFACTURING CO. EXPANDS.

The increased demand for their hydraulic presses, pumps, valves, accumulators and intensifiers, has led to the completion of plans for extensive plant and equipment improvements in the factory of the Hydraulic Press Manufacturing Co., Mount Gilead, Ohio, builder of vulcanizing presses. To relieve the crowded condition of the machine shop an addition 100 feet long by 60 feet wide will be erected and considerable new machine shop equipment will be needed, including a 20-ton electric traveling crane, a large motor-driven horizontal boring mill and a heavy-duty motor-driven planer.

A 20-foot extension will be added to the present power plant building and new equipment will be installed, consisting of a 300-horse-power Corliss engine and a 225-K-W generator. Two new steam boilers and stokers for three boilers will be added to the present boiler equipment. A building for oil storage will also be erected, the main stock room will be extended and another story added, giving additional space for the storage of small parts; the tool room will be enlarged and a new structural shop about 50 by 60 feet erected.

The plans also include an extension of the present erecting shop building, measuring 47 by 130 feet. For all of the building extensions brick and concrete construction with steel for the substructure will be used. All of the above improvements, except the last named, will be made immediately.

Replete with information for rubber manufacturers.—Mr. Pearson's "Crude Rubber and Compounding Ingredients."

SAVAGE TIRES IN MICHIGAN.

The Savage Tire Corporation, of San Diego, California, has recently opened a Michigan office under the name of the Michigan Savage Tire Sales Co., with S. E. Straight as branch manager, and headquarters at 429 Grand avenue, Detroit. A \$200,000 stock is carried, and will be increased as needed. Seventy sub-branches have already been opened in various parts of the city and state.

NEW CLUBHOUSE FOR McGRAW EMPLOYEES.

A recent campaign among employes of The McGraw Tire & Rubber Co., East Palestine, Ohio, to raise funds for a clubhouse resulted in subscriptions amounting to nearly \$2,000. The company has now appropriated \$10,000 additional as its donation, and plans have been prepared for the erection of the clubhouse on East Taggart street. The building will be two stories high in the front portion, the dimensions being 50 by 110 feet, exclusive of verandas. Every possible provision for the comfort and enjoyment of the employes will be made, including four bowling alleys in the basement, four or five pool tables, one billiard table, a barber shop, toilets, lockers and 15 or 20 baths, the latter being placed conveniently at the foot of a stairway leading from the gymnasium, 50 by 70 feet, at the rear of the main floor. This gymnasium will have a balcony around three sides. At the front, on the main floor, will be a large lounge, with a six-foot open fireplace, a library and music room, a cloak room, and committee room. The second floor of the front portion of the building will be devoted entirely to a well-equipped kitchen and dining room for use on special occasions.

RACINE AUTO-TIRE CO. TO BUILD.

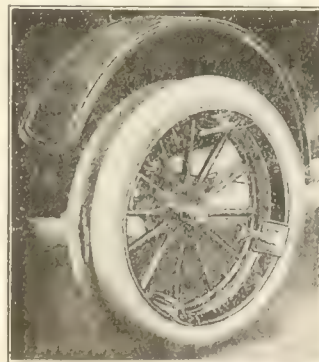
The Racine Auto-Tire Co., Racine, Wisconsin, has recently purchased a four-acre tract of land, known as the Wisconsin-Illinois baseball park, on which a modern plant will be erected in the spring. The new plant will have a capacity of 1,000 tires per day and will be built so that this may be greatly increased by adding to the units. Machinery has already been ordered from the Farrel Foundry & Machine Co., and electrical equipment from the Westinghouse Electric & Manufacturing Co.

The Racine company is running its present plant night and day, to its full capacity of approximately 250 tires and tubes per day.

THE TWIN RIM.

It is rather a clever idea that is embodied in this new and practical first aid device for tire troubles and which is really a modified form of a spare wheel. It comprises a rim of the

ordinary demountable type to which are riveted four lugs that are provided with slots for the fastening bolts. These are four specially formed clamps that fit over the inside of the felly and slip into the slots of the rim lugs. In case of a puncture or blow-out in either front or rear wheel the twin rim with the inflated tire upon it is placed beside the damaged tire, the clamps fitted in place, and by tightening the four bolts with a special wrench



provided for that purpose the car is ready to run any distance. It is claimed that this complete device weighs only one-fifth that of other demountable rims and can be attached in 5 minutes. [Twin Rim Co., Boston, Massachusetts.]

NEW INCORPORATIONS.

A. B. & S. Cement & Rubber Co., October 13 (Massachusetts), \$10,000. Arthur B. Alden, Brockton, Massachusetts; Daniel C. Smith, Morris A. Smith, George H. Bixby, William E. Bixby, and Charles H. Poor—all of Haverhill, Massachusetts. Principal office, Haverhill, Massachusetts. To manufacture and sell rubber cement, etc.

Achilles Rubber & Tire Co., October 19 (Delaware), \$1,000,000. E. Von Vargyas; Lawrence A. O'Dea and Lorenzo G. Warfield—all of Washington, D. C. Principal office, Colonial Charter Co., 927 Market street, Wilmington, Delaware. To acquire lands and buildings in New York or elsewhere for the purpose of manufacturing rubber tires and other articles of like nature.

Aeromarine Engineering & Sales Co., Inc., November 3 (New York), \$1,000. M. L. Weiland, 233 Broadway, New York City; Arthur H. Slack, 258 Lefferts avenue, and Henry Amerman, 439 Quincy street—both in Brooklyn, New York. To manufacture balloons, aeros, motors, etc.

American Chicle Co. of New York, Inc., October 25 (New York), \$10,000. Thomas Adams, 763 Fifth avenue; John D. Adams, 1 West 72nd street—both in New York City, and Horatio M. Adams, Glen Cove, New York.

Beach, Knowles & Hill, Inc., November 3 (New York), \$25,000. Charles S. Beach, 605 West 137th street; Paul H. Knowles and Luigi Solari, 205 West 89th street—both in New York City. To deal in auto parts and accessories, etc.

Big Four Tire & Rubber Co., The, September 5 (Delaware), \$1,000,000. G. H. Ritchie (president), 280 Miles avenue; B. Wingerter, (vice-president), South Howard street; Dr. C. C. Spangler (secretary), 17 South Howard avenue, and O. P. Lamuel (director), Adams street—all in Akron, Ohio, and W. E. Wingerter (treasurer), 736 Guardian Building, Cleveland, Ohio. Principal office, 736 Guardian Building, Cleveland, Ohio. To manufacture and deal in tires and other rubber goods.

Christman Tire Co., Inc., November 13 (New York), \$2,000. Jacob K. Christman, 247 Post avenue; Arthur A. W. Brewster, 569 Plymouth avenue, and Clayton R. Brown, East Rochester—all in Rochester, New York. Principal office, Rochester, New York. Auto tires, etc.

Columbia Scrap Rubber Co., November 1 (New Jersey), \$50,000. Yvette Gordon, Louise De Piano, Frank De Piano, Joseph Gordon, Antonio De Piano—all of Trenton, New Jersey. To import, buy, sell and deal in scrap rubber, etc.

Crown Tire & Rubber Co., October 4 (Nebraska), \$250,000. Henry A. Reichenbach, Omaha, Nebraska; Henry C. Meier, Council Bluffs, and Jesse P. Howe, Des Moines—both in Iowa. Principal office, Omaha, Nebraska. To manufacture and sell, wholesale, automobile tires and other rubber goods.

Deltire Rubber Co., November 9 (New Jersey), \$25,000. Alexander Trapp; John R. D. Bower and Catherine Pippel Hornyak—all of Trenton, New Jersey. To manufacture and deal in rubber goods, etc.

Ehman Tire & Rubber Co., November 8 (Illinois), \$150,000. A. C. Ehman (president), Francis Lackner (vice-president), M. J. Flynn (treasurer), Judge Jesse Holdom, W. A. Vail and A. B. Larkin. Principal office, La Salle and Twenty-seventh streets, Chicago, Illinois. To manufacture automobile tires and mechanical rubber goods.

Elkland Tanning Co., November 16 (Maine), \$100,000. G. L. King (president), 71 West street; A. E. Pierce (treasurer), 23 Noyes street, and Charles L. Donahue (clerk), 277 Congress street—all in Portland, Maine. To manufacture and deal in rubber, etc.

Elliot Rim Chain and Tread Corporation, October 31 (New York), \$100,000. D. Kern Einfurer, 1491 East Tenth street; Walter L. Perley, 1009 Lincoln Place, and Joseph J. Miller, 310

St. Johns Place—all in Brooklyn, New York. Principal office, Esopus, New York. Auto parts and accessories.

Englewood Tire & Supply Co., November 4 (Illinois), \$5,000. F. F. Symonds, John H. Cadmus, and Oliver H. Starrett. Principal office, 501 West Garfield Building, Chicago, Illinois.

Fox-Senior Tire Co., July 15 (Connecticut), \$25,000. C. S. Fox, T. R. Senior, C. M. Fox and S. P. Senior—all of Bridgeport, Connecticut. Principal office, 357 Fairfield avenue, Bridgeport, Connecticut.

Globe Auto Accessories Co., Inc., October 23 (New York), \$500. William F. Watters (president), 26 Plymouth avenue, South; S. X. Newman (vice-president and sales manager), 453 Seneca Park Way, and F. B. Ræ (secretary and treasurer), Ambrose street—all in Rochester, New York. Principal office, Ambrose street, Rochester, New York. To sell tires, tubes, etc.

Good-Wear Rubber Co., The, September 21 (Ohio), \$500,000. W. E. Deve (President), H. B. Kishman and A. E. Beckel, Vermilion; Jacob E. Murbach, (vice-president), Walter E. Brooks, (treasurer), Elyria; J. J. Dauch, Sandusky; William Seher, and L. S. Grimm, Lorain—all in Ohio. Principal office, Suite 307, Masonic Temple, Elyria, Ohio. Manufacturer of tires, tubes, and rubber sundries.

Grossman, Emil, Manufacturing Corporation, November 8 (New York), \$410,000. Harry Radzinsky and Julius Bregman, 233 Broadway, New York City, and Reuben Stern, 109 Walton street, Brooklyn, N. Y. Auto parts and accessories.

Keystone Rubber Co., October 16 (New Jersey), \$25,000. Harry Johnson, Yardville; Albert Hughes and Richard M. J. Smith, Trenton—both in New Jersey. Principal office, Yardville, Mercer County, New Jersey. To purchase, buy, sell and manufacture soft rubber goods.

Kip Vulcanizing Co., Inc., November 9 (New York), \$1,000. B. Franklin Klass, 523 West 152nd street, William T. Weidenman, 154 West 68th street, and Kenneth A. Palmer, 359 Mosholu Parkway—all in New York City. Repairing tires, etc.

L. P. Ross Co., Inc., November 9 (New York), \$25,000. William H. Porter, 68 Mortimer street, Rochester, New York; Henry B. Hubbard and George H. Mayo—both of 1790 Broadway, New York City. Principal office, Rochester, New York. To deal in rubber goods, etc.

McClure Tire & Rubber Co., September 21 (Ohio), \$15,000. J. A. McClure, Jr. (president); E. Buchanan (vice-president); R. T. McClure (secretary and treasurer); J. P. Eagleson (attorney), 8 East Broad street; and A. M. Howson, 446 West 8th avenue—all in Columbus, Ohio. Principal office, 212-216 East Gay street, Columbus, Ohio. To deal in tires, reliners, blow-out patches, etc.

Minnesota Tire & Rubber Co., September 6 (Minnesota), \$200,000. Harry A. Trenhold, Minneapolis; Nels L. Werner, Red Wing—both in Minnesota, and James W. Adams, Ellsworth, Wisconsin. Principal office, St. Paul, Minnesota. To manufacture and deal in tires, rubber goods and accessories.

Non-Deflating Inner Tube Co., October 24 (Ohio), \$100,000. J. A. Sullivan, Henry Roegge, A. W. Stockman, M. D. Wagner, and John A. Elden, 1325 Williamson Building, Cleveland, Ohio. Principal address, 1325 Williamson Building, Cleveland, Ohio. To manufacture a non-deflating inner tube.

Nu-Way Cure Co., October 6 (Wisconsin), \$20,000. R. C. Moore, 226 Hazel street; Joseph E. Freix, 519 North Broadway street; E. W. Gilsdorf, 414 Fifth street; J. J. Wirtz, 620 East Walnut street, and F. S. Kaup, 1116 Cherry street—all in Green Bay, Wisconsin. Principal office, Green Bay, Brown County, Wisconsin. To manufacture and sell a preparation for the purpose of curing punctures in pneumatic tires and all other automobile accessories.

Partridge, F. E., Rubber Co., Limited, The, September 25 (Dominion of Canada). F. E. Partridge (president), Vincent

Cooke (vice-president), F. M. Ker (secretary-treasurer). Principal office, Guelph, Ontario, Canada. To manufacture tires, tubes and druggists' sundries.

Port Arthur Tire Co., September 19 (Texas), \$2,000. A. F. Hughes, C. M. Dismukes and J. R. Campbell—all of Port Arthur, Texas. Principal office, Port Arthur, Texas. Deal in tires.

Public Service Tire & Rubber Co. of New York, Inc., November 18 (New York), \$100,000. Richard Krause, Clason Point; G. H. Empey, 446 Lexington avenue, and T. A. Anderson, 226 Utica street—both in Brooklyn, New York.

Quick Service Tire Co., Inc., October 24 (Texas), \$5,000. F. Aitken, Alex Feigleson and Charles T. Butler—all of Beaumont, Texas. Principal office, Beaumont, Texas. To deal in tires, tubes, automobile accessories, etc.

Reuter Puncture-Proof Tire & Tube Co., October 6 (New Jersey), \$125,000. George Joseph Reuter, 182 Montclair avenue; Alfred Strauss, 73 Hedden Terrace, and Louis R. Freund, 152 Johnson avenue—all in Newark, and Abraham M. Herman, Pleasantville—both in New Jersey. Principal office, 810 Broad street, Newark, New Jersey. To manufacture, buy, sell, import, export and generally deal in tubes and tires for automobiles, etc.

Runyan Cushion Wheel Co., October 12 (Nebraska), \$100,000. H. O. Wulff, D. R. Sowards, E. J. Conrad, and Fred C. Burlington—all of Omaha, Nebraska. Principal office, Omaha, Nebraska. To manufacture a patent cushion wheel.

Rynehart Rim Tool Co., Inc., November 16 (New York), \$5,000. Henry M. Rynehart, 17 Fulton street, and L. Nissen, 166 DeKalb avenue—both in Brooklyn, New York, and John H. Jansen, 41 Park Row, New York City.

S. & J. Raincoat Co., Inc., The, November 22 (New York), \$1,000. Solomon Blickman, 38 Montgomery street, Joseph Golombeck, 38 Suffolk street—both in New York City, and Harry P. Sweetgold, 161 Kosciusko street, Brooklyn, New York. To manufacture waterproof clothing, etc.

San Francisco Tire Co., Inc., November 3 (New York), \$6,000. Sydney Bernheim, 35 Nassau street, New York City; Catherine A. Weldon, 591 Seventh street, and Harry H. Jacobson, 555 Grand street—both in Brooklyn, New York. Tire manufacturing business.

Selum Manufacturing Corporation, The, November 13 (New York), \$100,000. Stephen Oderwald and Rose A. Chenska, 231 Elm street, Astoria, New York, and Henry M. DeSulykowsky, 61 West 61st street, New York City. To manufacture Se-Lum and other auto supplies.

Schwab Improved Tire Co., October 10 (Minnesota), \$50,000. John Schwab, Martin Schwab and William H. Ellinger—all of Minneapolis, Minnesota. Principal office, Minneapolis, Minnesota. To manufacture improved automobile and vehicle tires, parts and accessories.

Sheldon Tire Co., Inc., November 8 (New York), \$1,000. Burton K. Sheldon, Charles Kuhn and Cleveland Pond—all of Buffalo, New York. Principal office, Buffalo, New York. To deal in auto tires.

Springfield Tire Service Co., September 14 (Illinois), \$5,000. Edward G. Mitts, Philip Stewart, and L. L. Bingham. Principal office, 303 South Fourth street, Springfield, Illinois. To handle and sell automobile tires and accessories, etc.

Standard Tire & Rubber Manufacturing Co., The, April 4 (Washington), \$500,000. Max Freed, Edward P. Fick, Ivan Bushong, R. Freed and F. N. Rhodes. Principal office, Seattle, Washington. To sell rubber tires and goods.

Stearns Rubber Co., October 20 (New Hampshire), \$15,000. William A. Pressey (president), Hampton Falls, and William F. Stearns (secretary and treasurer), Exeter—both in New Hamp-

shire. To take over the business of The Rubber Step Manufacturing Co., Exeter, Ohio, manufacturers of automobile tubes, rubber covered steps and pedals, and mechanical rubber goods and specialties.

Superior Rubber Co., Inc., October 23 (New York), \$25,000. George J. Hagmaier, Pittsburgh, Pennsylvania; Elmer W. Hagmaier and Joseph Porzell, Buffalo, New York. Principal office, Buffalo, New York.

Syracuse Tire Co., November 1 (New York), \$10,000. Sydney Bernheim, 35 Nassau street, New York City; Catherine A. Weldon, 591 Seventh street, and Harry H. Jacobson, 555 Grand street—both in Brooklyn, New York. To manufacture tires.

Tropical Tire & Rubber Co., Inc., November 16 (New York), \$25,000. William W. Thomas, Alfred M. Lazarowitz, and Abraham Solomon—all of 51 Leonard street, New York City.

Twin River Rubber Works, Inc., November 22 (New York), \$100,000. Julius Schmid and Charles F. Schmid, 470 Fourth avenue, New York City, and Paul Henkel, West Nutley, New Jersey. To manufacture rubber goods of all kinds.

Van der Linde Rubber Co., Ltd., October 26 (Dominion of Canada), \$350,000. Harold van der Linde (president), H. C. Scholfield (vice-president), and T. D. Bailey (secretary and treasurer). Principal office, 142 Weston Road, Toronto, Ontario, Canada. To manufacture and deal in tires, tubes, packing, and general molded goods.

Washington Rubber Co., October 2 (Delaware), \$50,000. Charles D. Cugle, Kenneth W. Cugle, Howard C. Newcomer, William J. Hart—all of Washington, D. C. Principal office, Delaware Charter Guarantee & Trust Co., 328 duPont Building, Wilmington, Delaware. To produce, buy, sell and deal in rubber and the articles and goods of all kinds of which rubber is a component part.

THE "EVER-WARM" SAFETY SUIT.

Recently a practical test was made in the Atlantic Ocean near Manhattan, just west of the West Banks light, of the Youngren life preserver. Thirteen demonstrators, three of whom were girls, clothed in "Ever-Warm-Safety-Suits," as they are called, leaped into the ocean, one after the other, from a steamer while under way. The illustration shows them grouped together, each supported in an upright position, warm and dry, waiting to be



rescued. This device was illustrated and described in THE INDIA RUBBER WORLD, November 1, 1915. [National Life Preserver Co., Inc., New York City.]

In a 28-room apartment in New York City renting for \$30,000 a year, the kitchen, pantries and service rooms are floored with blue and white rubber blocks.

THE RUBBER TRADE IN BOSTON.

By Our Regular Correspondent

THE rubber sole industry received a good boost at the monthly banquet of the Boston Boot and Shoe Club, when Ex-President Donovan, who is a leading manufacturer of men's shoes, declared that the present high prices of sole leather had led shoe manufacturers to substitute rubber and composition soles in some of their lines, and that experience had proved them to give better service than ordinary sole leather. Makers of this class of goods are receiving heavy orders, and leading shoe manufacturers are among their best customers. These composition soles are made of rubber in combination with other materials, added to give increased wear, and to prevent slipping. Leather cuttings, ground to a fibrous state, are used largely for this purpose, but cotton and flax fibers are also among the materials employed.

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But high prices are not confined to sole leather. Furniture and upholstery leathers, carriage and automobile leathers are all so expensive as to be almost prohibitive, and artificial leather is coming into use much faster in consequence.

Until recently attempts to produce an artificial leather to be used in shoe uppers have not been successful. A new material, made by the Reading Rubber Manufacturing Co., is already being used in considerable amounts for shoe topping. This is a coated fabric, closely resembling matcalf or gun-metal calf in appearance and texture. While it has not yet been used extensively in vamps, some manufacturers of infants' shoes are employing it for the entire uppers. The sales, through L. C. Chase & Co., of Boston, already exceed 100,000 yards.

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The Boston Woven Hose & Rubber Co. is adding still another building to its great plant at Cambridge. Like those recently completed, it is of reinforced concrete, comprises four stories and basement, and measures 65 by 324 feet. It will be used for the friction tape, coated fabric and molded goods departments. It stands on the site of the old friction tape department, and to avoid any stoppage of maximum output was built complete to the roof one half at a time. When all the alterations and contemplated additions to this plant are completed, it will be one of the finest and most up-to-date rubber manufacturing establishments in the country.

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The Converse Rubber Shoe Co. has just completed enlargements to its factory and shipping departments which more than double its floor area and producing capacity. Much of the new space is already occupied, but because of delays in receiving machinery, the full benefit of this extension has not yet become available. A gravity conveyor has been installed, also another motor, and new mixers and calenders will be added. Rest rooms and a restaurant have been established, while every department is being extended and enlarged to take care of increased business. The storehouse and shipping department, in an entirely separate building, have also been nearly doubled in size, giving additional facilities for carrying a much larger stock. To this building runs a railroad siding, for direct receipt of raw material and shipment of finished goods. The manufacture of tires is carried on in a separate building, which will be brought up to present requirements as soon as the footwear factory is in full running order. The present capacity of the latter factory is now 15,000 pairs of shoes daily.

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Wilbur N. Shelton has been appointed general manager of the L. J. Mutty Co., 175 Congress street, Boston, manufacturer of fabrics for the automobile, and tubing for automatic piano players, in which it has developed a large business. After completing his education, Mr. Shelton entered the employ of the

Conant Rubber Co., of Hartford, Connecticut, and rose to the position of salesman in southern New England. For 23 years he was connected with the Franklin Rubber Co., Malden, Massachusetts, and for the last 10 or 12 years has been its general sales manager, visiting the large customers of this company in the principal western cities. Thus he brings to his new position an experience of great practical value. W. S. Osborne, formerly connected with the Boston Safe Deposit Co., is now with the L. J. Mutty Co. as assistant treasurer, succeeding F. H. Brown, who has retired.

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A new hospital has recently been installed at the factory of the American Rubber Co., East Cambridge. It is situated at about the center of the large group of buildings, and on the ground floor conveniently near the calender and mill rooms, where the most serious accidents are likely to occur. There are two intercommunicating rooms, one used as a hospital, or first-aid room, the other suitably fitted up as a rest room for the women employes in case of illness or fatigue. The hospital room has hard plaster walls, metal ceiling, and sanitary marbleoid flooring, and is finished throughout in white enamel. The regulation hospital furniture is of white enameled steel, and the room is otherwise equipped with every appliance and material necessary to give immediate treatment in any emergency.

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The Rockland Webbing Co., manufacturer of non-elastic and elastic webbings, at Rockland, Massachusetts, has taken a ten-year lease of the plant of the Victory Webbing Co., at North Abington, and will run both factories, thereby practically doubling the firm's productive capacity. The Victory Webbing Co. has already discontinued business.

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The recently completed garage of the Monatiquot Rubber Works Co., South Braintree, Massachusetts, is a semi-circular brick building located near the main office and adapted for the accommodation of officers' cars as well as commercial trucks. It is of the most modern type, each car stall being provided with a separate door entrance and individually equipped for washing and all maintenance.

An extension to factory building No. 3, now in progress, will soon make available an increased output of the Monatiquot company's products.

THE RUBBER TRADE IN AKRON.

By Our Regular Correspondent

JUST what the tire industry has meant to Akron is shown by the tremendous increase in population and in building. In 15 years it has grown from a town of about 12,000 inhabitants to a great city of primary importance and known to motorists the world over. The building permits issued in 1915 represented an investment of \$6,000,000, and for the first nine months of the present year, \$9,800,000.

Long famed as the "Rubber City," Akron has now qualified as "Ohio's Eight-Hour Town." The Firestone, Goodrich, Goodyear and other rubber factories have recently adopted the eight-hour system, and while the results vary somewhat, general satisfaction is expressed by employers and operatives. The reports range from an increase in cost of production so slight as to be characterized as "about an even break" compared with the ten or twelve-hour work day, to a statement that in certain departments the eight-hour system has effected an 18-per cent increase in production with only a 10-per cent wage increase, while workmen are averaging the same pay per week that they did under the longer hours.

Tire factories are operated mainly by piece work, and in adopting the eight-hour day the rates were readjusted so that the men would receive at least as much money as before. The result

has been increased production and often increased wages together with reduced cost, except in a few departments where the differences are so slight as to be of little consequence. Tire builders average \$4.50 a day as before; the lowest pay is \$2.50 a day for sweepers, and from that up to \$6 a day for heavy work. Quality is insured by rigid inspection and a limit on production where necessary.

The philosophy of this greater efficiency is best explained in the words of H. S. Firestone, president of the Firestone Tire & Rubber Co.: "There is nothing sentimental, paternalistic or philanthropic in our adoption of the eight-hour system. But you can't make men do their best unless you get them fully interested, proud of what they are doing, happier in mind, better in body and spirit, and producing something for themselves while they produce something for the business organization of which they are a part."

At the annual meeting of the Firestone Tire & Rubber Co., which was held November 2, several important business matters were acted upon. The call for the meeting, dated August 31, proposed an increase of the capital stock to \$50,000,000, and a stock dividend of 700 or 800 per cent. Instead of this the stockholders voted to fix the authorized capitalization at \$15,000,000, and to reduce the nominal value of shares from \$100 to \$10. It was also voted to enlarge the board of directors from five to seven members, and to sell \$500,000 worth of common stock to employes and officers.

Perhaps the action which received the greatest comment was the motion to set aside \$1,000,000 for an employes' welfare and insurance fund. This, coming almost immediately after the dedication and presentation to the employes of the handsome new clubhouse, built at a cost of \$300,000, adds another link to the great welfare chain that binds together employer and employes.

The election, at the annual meeting, of R. J. Firestone as vice-president came as the direct result of his splendid record as general sales manager for several years past. Under his direction sales have been increasing at the rate of 30 to 60 per cent annually until at the end of the fiscal year which closed August 1, Firestone business had exceeded \$33,000,000. Mr. Firestone is widely known in motor car circles throughout the country and as vice-president will find even more and broader opportunities to utilize his knowledge, long experience and forceful personality to good purpose.



R. J. FIRESTONE

A. G. Partridge, formerly assistant sales manager, has succeeded Mr. Firestone as general sales manager. Long service well equips him for the larger work and his appointment is in accord with the Firestone policy of promoting men who have made good. F. C. Blanchard has also been promoted to sales manager in charge of the increasing business among motor car manufacturers.

The B. F. Goodrich Co. has adopted a plan designed to co-ordinate the various departments of the factory more closely and bring the executives in closer touch with the employes. An operating committee has been established by the directors of the company, which will advise with and aid the executive committee in all matters affecting the interests and management of the company. The members of the new committee are as follows: H. E. Joy, director of costs of goods and factory costs; W. O. Rutherford, director of sales; H. K. Raymond, director of production; A. B. Jones, director of plant administration; W. C. Geer, director of development of goods and processes; George Oenslager, director of chemical laboratories; W. A. Means, treasurer; A. P. Lohmann, engineer; H. C. Miller, manager of tire sales, and W. H. Yule, manager of sales of general rubber goods.

Arthur H. Marks, of The B. F. Goodrich Co., is the owner of the largest yacht in American waters and probably in the world, fitted with internal combustion engines. The "Aramis" is 157 feet in length over all, with 23 feet beam and a draft of 7 feet 6 inches. Her motive power consists of two 350 horse-power Craig-Diesel engines delivering her power at 300 revolutions per minute. Built entirely of steel, she also has two steel deck houses, one covering the dining saloon forward, and the after one built over the music hall and reception room. She is finished in mahogany and bright metal work and so makes one of the handsomest yachts afloat. Her tanks carry 6,000 gallons of crude oil fuel, which gives her a very long cruising radius. Besides the staterooms for the owner and his guests, there are quarters aboard for the crew of nine officers and men required to run her.

Within a short time Mr. Marks will take an extended Southern cruise in his new possession.

The Miller Rubber Co. is erecting a large eight-story building as an addition to its plant, and has also purchased 30 acres of ground in a suburb of Akron. The entire tire building plant will be located on this new property in the spring, the present factory being then devoted to druggists' sundries and other specialties.

The Amazon Tire & Rubber Co. manufactures a standard tire with an extra side-wall breaker strip, or blow-out protection, added. At present, the factory turns out about 45 tires a day. Recent large increase in business has made it necessary to add to the plant in order to expand the production, and when the new four-story building now being erected is completed, the output will average 300 tires daily.

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The Goodyear Tire & Rubber Co. has purchased 10,000 acres of land in the Salt River valley, Phoenix, Arizona, where cotton raising will be undertaken on a large scale, thus insuring for the company's use a fixed supply of long staple Egyptian cotton.

James E. Taylor has been transferred from the Atlanta (Georgia) office of the Goodyear company to the home office, as special representative of the automobile tire department.

The Phoenix Rubber Co. has increased its capital stock from \$125,000 to \$500,000.

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Two frame buildings are being erected for the Kelly-Springfield Tire Co. One will house the restaurant, now on the top floor of the main building, and the other the experimental department, this arrangement giving needed space for other purposes in the main building.

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Sam S. Miller, factory manager of the Mohawk Rubber Co., recently celebrated the completion of his twentieth year of tire

building. Beginning with solid carriage tires and pneumatics for bicycles, he was among the first to provide the necessary tire equipment for automobiles, and from that day to this has taken a personal pride in maintaining the quality of his product. His particular interest has been the careful choice of raw materials.

THE RUBBER TRADE IN RHODE ISLAND.

By Our Regular Correspondent

THE month of November was a rather unsettled one in the rubber industry of Rhode Island, labor troubles having been experienced at two of the United States Rubber Co.'s plants—the National India Rubber Co., at Bristol, and the Alice rubber and shoe mill of the Woonsocket Rubber Co., at Woonsocket. In consequence of the strike at the National company's plant, work at the Narragansett Rubber Co. in that town was interrupted and the workmen threatened by the strikers if they did not go out.

While the situation at Bristol at one time appeared to be assuming a serious aspect, the firmness of the police and the severity of the court kept matters well in hand and resulted in an early understanding that led to an amicable settlement.

Throughout the state, rubber factories have an increasing number of orders ahead with a continued scarcity of help, although it is reported that applications for employment have recently been more numerous than at any time for several months. There appears to be no prospect of any immediate let-up in the demand for shoes, tires, medical goods and other lines made here.

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The announcement on November 23 of a 10 per cent "emergency increase because of abnormal world conditions," affecting 7,500 to 10,000 employes of rubber factories in Rhode Island, did much to clarify the situation, and it is now thought that there will be no further labor troubles, at least during the continuance of the present scale and agreement.

The notices posted at the mills controlled by the United States Rubber Co. announced that the increase was in the nature of a cash bonus, but those posted in the factory of at least one company were for a straight raise of 10 per cent. In another mill the management states that it was the third raise to its employes within the calendar year and that a new record in the payment of wages had been established in the trade.

The mills affected by the United States Rubber Co.'s notice in Rhode Island and the number of employes in each are the Alice Mills at Woonsocket, 1,600; the Millville Mill at Millville, 800; the Lawrence Felting Co. at Millville, 250, and the National India Rubber Co. at Bristol, 4,000. In Providence the Revere Rubber Co. employs 700 to 800 operatives; the Mechanical Fabric Co., 250, and the Narragansett Rubber Co. at Bristol, 700.

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The increased business experienced by the Narragansett Rubber Co., of Bristol, has been so great during the last few months that it has become necessary to provide additional factory room. A complete rearrangement of the plant with additional departments is under consideration, but meanwhile temporary arrangements are being made to take care of immediate demands. A new addition, 85 by 50 feet, has just been erected on the Richmond street side of the plant that will afford some relief for the present. Part of the lower floor will be utilized by the calendering department and the remainder will be occupied as a storehouse. The second floor will be absorbed by the steadily increasing shoe business.

The two-story frame manufacturing building on South Main and Wheaton streets, Warren, is being remodeled for occupancy for storage purposes by the National India Rubber Co., of Bristol, by whom it has been leased.

John E. Magee, for the past 17 years electrician at the factory of the National India Rubber Co., is now policing the entire plant at Bristol.

Robert W. S. Cox, for several years sales manager of the insulated wire department of the National India Rubber Co., has resigned and gone into business for himself with headquarters at Boston. George Cragin has been appointed general sales manager of the wire division, coming to Bristol from New York, where for a number of years he held a responsible position with the American Steel & Wire Co.

William McCaw, formerly paymaster in the office of the National India Rubber Co. at Bristol, but more recently assistant treasurer of the Lee Tire & Rubber Co., Conshohocken, Pennsylvania, has recently been promoted to sales manager in the South, with an office at Atlanta, Georgia.

THE RUBBER TRADE IN TRENTON.

By Our Regular Correspondent

THE "Best" fire hose of the Empire Rubber & Tire Co. won new laurels a few days ago when the city of Detroit, Michigan, placed an order for 8,000 feet of it. Detroit has been using Empire hose for some time and the best evidence of the satisfaction it has given is reflected in the order just placed. Never before has the mechanical goods department enjoyed such prosperity as at present. It is an old story about the tire department working both night and day to turn out 1,500 tires daily, and now this same gratifying condition of affairs has reached the mechanical goods department, now averaging \$800,000 annual business. The molded hose department is also rushed with orders.

The big increase of the business of the Empire company has necessitated reorganizing and refinancing by incorporating under the laws of the State of Virginia. The new company, to be known as the Empire Tire & Rubber Corporation, has a capital consisting of \$1,500,000, 7 per cent cumulative convertible preferred, par value \$100, and \$4,500,000 common, par value \$10. The preferred stock is offered for public subscription by Andrews & Co., New York City, and is convertible at the option of the holder into an equivalent par value of common between June 30, 1917, and July 1, 1920. The new affiliations are expected to insure a \$5,000,000 business annually, or about double the present output.

General C. Edward Murray, president of the Empire Rubber Co., Trenton, New Jersey, was among the speakers at the Chamber of Commerce dinner held recently at the City Club in Boston, Massachusetts.

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The Home Rubber Co. is erecting an addition to its plant costing \$750,000.

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The Adolph Biller Rubber & Leather Cement Co. has been formed here, with Adolph Biller as the active head. The company has a well equipped factory, and for the convenience of the trade a down-town office has been opened. A new cement for automobile tires and the shoe trade is to be featured this year.

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The John A. Roebling's Sons Co. is among the concerns which have been allotted space in the electrical and industrial show to be held in Masonic Temple from the first to the fifth of this month.

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John Hermann, Jr., superintendent of the Woven Steel Hose & Rubber Co., paid a novel election wager when he wheeled a Wilson man through the streets in a barrow. A drum corps accompanied the outfit and there were about two score people trailing behind burning red fire, beating on pans, etc.

The India Rubber Trade in Great Britain.

By Our Regular Correspondent.

THE calling of men to the colors proceeds apace with more disastrous effects upon small businesses than upon large ones. Few firms have had to close down entirely for this cause, but one instance has come to my personal knowledge. This is the interesting crude rubber washing business that was carried on by the late Mr. Eyre at Holywell, North Wales. Since Mr. Eyre's death the business known as the Meadow Mills, Limited, has been carried on by his son, but the recent calling of many of the hands and of William Eyre himself to the colors has necessitated the temporary stoppage of the works, which are interesting from the fact of the motive power for the rubber washing machines being derived from a water-wheel. The company has an office at 4 South Bridgewater street, Liverpool. Possibly there are other cases of closing down in the rubber trade, but as a rule dilution of labor has enabled the management to keep going, even if on a smaller scale than customary.

AMERICAN CHEWING GUM IN ENGLAND.

There is no getting away from the war, and a minor point of some interest which has resulted from its incidence is the popularization of American chewing gum in Great Britain, where its use was formerly practically unknown. It is said that about 40 years ago the chewing of pure erasing rubber was not unknown in certain circles, a working day being required by the operator to reduce the material to a pulp. I understand that the present-day American product, as used by Canadian soldiers, is a much superior article to erasing rubber, so it is quite probable that the chewing habit will become popular here.

PETROL AND SUBSTITUTES

The petrol restrictions, as was anticipated, have had a considerable effect on the tire industry; an effect which would have been more pronounced if they had come into force earlier in the summer. With regard to the use of substitutes, several of which have made their appearance on the market, some appeal cases are pending, arising out of conviction of charabanc owners in courts of summary jurisdiction.

CRUDE RUBBER.

There is nothing new in the raw rubber situation, except in the magnitude of the stock on hand, which some say is in part already the property of the enemy, to be utilized when the long deferred peace comes. A topic which has occasioned a good deal of wonder and talk is the enormous expansion of the American imports of rubber, which have risen from 57,253 tons in 1913-14 to 117,441 tons in 1915-16. Progress like this ought to reassure those pessimists who foretell a glut of rubber a few years hence.

VULCANIZATION WITHOUT SULPHUR.

Our contemporary, the "India Rubber Journal," has recently given an important translation of Ostromyslenski's papers in Russian on the subject of vulcanization. The researches detailed in these papers deal with (1) the hot vulcanization of rubber by nitro compounds without sulphur and (2) the hot vulcanization of rubber by means of peroxides or "per-acids" in absence of sulphur. I shall not reproduce any part of these papers here, as they were reprinted in THE INDIA RUBBER WORLD for November, but merely wish to call attention to what are undoubtedly discoveries in rubber chemistry and which may have a profound influence upon rubber technology. I say "may" rather than "will," because, as we all know, the best and in most cases the only reliable test of a novelty in rubber manufacturing procedure is that of longevity. In the past we have been taught to avoid the use of bodies such as peroxides in rubber and there will be many who will prefer to wait and see what the rubber looks like after a year or two before allowing themselves to wax enthusiastic over the new discoveries.

So far I have not found any enthusiasm on the subject among the purveyors of sulphur specially prepared for the rubber trade, but they console themselves with the fact that the much talked of use of amido compounds in vulcanization has not brought about any appreciable diminution in the volume of their business.

An interesting point for the future is how the rubber vulcanized without sulphur will behave under the various reclaiming processes. It is quite possible that superior reclaims will be obtained by some modification of the chemical reaction involved. Another point to be considered is that sulphur is frequently used as a filler to add bulk to the rubber in addition to effecting vulcanization. In this case it does not usually rank as mineral. In order, then, to keep the specific gravity the same, a substitution of some other mineral matter for the sulphur would have to take place, as the new vulcanizers are used in such small quantity.

ESTIMATING THE SULPHUR IN RUBBER.

Another paper by J. B. Tuttle and A. Isaacs on the estimation of total sulphur in rubber, and emanating from the Bureau of Standards, Washington, U. S. A., is full of interest and seems to emphasize the opinion I came to years ago, that it is difficult to lay down any method that is equally accurate with all rubber goods, from toy balloons to perambulator tires. A method that may give excellent results with rubber of one composition may prove faulty in the case of quite another composition. A point that must not be lost sight of is that time is often of greater importance than extreme accuracy. In a great many industries analytical methods of quite sufficient accuracy are in daily use, because results are wanted and it is impossible to wait a week for them. Many methods which are properly indispensable in the research laboratory where time is of no object are frequently put before the worthy chemist, who finds it impossible to employ them. Of course, if the new vulcanization without sulphur comes to anything, the correct estimation of this element loses its present importance.

SCOTTISH BUSINESS NOTES.

The North British Rubber Co., Limited, Edinburgh, has issued an attractive illustrated booklet comprising a price list for sand shoes and tennis shoes for 1917. With regard to these it is a condition of sale that in the event of a notification of an advance in price during 1917 no sales shall be made by customers below such advanced prices, even though the goods may have been delivered by them prior to the date of such advance. A novelty in the list is the khaki-colored canvas shoe which it is stated is much in demand in military circles, presumably such circles as are still in training at home.

The special grooved soling, which was brought out by the company, is intended to get over the trouble of breakage at the base of the groove. The grooves do not run directly across the sole, but are at a slight angle, which quite overcomes the difficulty previously experienced. The Clyde Rubber Works, Limited, which a few years ago removed from Glasgow to more commodious premises at Renfrew, a few miles away, reports very good business in mechanical rubbers, especially for railway requirements, in which the company specializes. Mr. Sharp and his son are the moving spirits in the management of the works.

RUBBER SPONGES.

Like food and all sorts of other commodities, the natural sponge has risen in price owing to the war. This has led to an increased demand for the rubber sponge, a demand which is being satisfied to a large extent by importations from America. As one now rarely sees in the shop windows the mystic Russian characters adorning labels on sponges, it looks as if the well-

Imports of American goods from the Russian American India Rubber Co., of Petrograd, had ceased coming, or at any rate only in reduced quantities. American sponges are being sold at the low price of sixpence at the F. W. Woolworth & Co., Limited, new stores in Manchester. Rubber household gloves can also be bought at these stores for sixpence each, one glove if you do not want a pair.

FINANCIAL RECORD

This extremely successful rubber manufacturing firm has again increased its capital, this time to three million pounds by the creation of one million cumulative $6\frac{1}{2}$ per cent preferred shares of £1 each. The proceeds of this issue are intended to finance the carrying of larger stocks, and also to provide working capital for a new department for the manufacture of solid motor tires for transport purposes. Sir Arthur Du Cros, Baronet, who presided at the meeting, made some rather trenchant remarks about foreign competition. The new association of British Tyre Manufacturers, of which he was president, have it as their main object, he said, to protect the interests of British manufacturers, there being no question of amalgamation to control prices.

SOME FOREIGN RUBBER NOTES.

SWISS MARKET FOR EBONITE.

THE American Consul at Berne, Switzerland, reports that, despite a considerable home production, about \$25,000 worth of foreign ebonite of the better qualities was purchased yearly by Switzerland before the war, principally from Germany, Italy, and France. Present importations, however, amount to only one-fourth of that figure. No more rubber or kindred articles can be obtained from Germany, but Swiss buyers have been able to obtain small quantities from France and England. Efforts are also being made to obtain goods in the United States, but importers are experiencing difficulty in getting deliveries.

One large Berne concern, which makes practically all of the telephonic and telegraphic apparatus used in Switzerland, and is said to be one of the largest consumers of ebonite in the country, bought up all the ebonite that could be found in the republic. It was thus able to continue business in the ordinary way, but its small stocks are decreasing rapidly. An order placed in America six months ago by this firm is still unfilled. The company uses ebonite in sheets, thickness 0.5 millimeter to 30 millimeters [0.019685 to 1.1811 inches], in round rods from 2 to 30 millimeters [0.07874 to 1.1811 inches], in tubes from $2\frac{1}{2}$ to $3\frac{1}{2}$ centimeters [0.98425 to 1.37795 inches], and various other forms and sizes.

It appears that Swiss consumers are buying direct from the manufacturers, either domestic or foreign. There are no local agents or dealers in the trade. Before the war ebonite goods were sold by the Swiss manufacturers on terms of 30 days with 2 per cent., or 3 months net. On imported wares the terms formerly were 30 days net after arrival of goods; since the war, cash against documents. The duty on ebonite in bands, sheets, various forms of manufactured articles, cords, bullets, rods, etc., is \$0.0875 per 100 pounds.

The following are the principal consumers of ebonite:

Hasler Aktiengesellschaft Telephon & Telegraphenwerkstätte, Schwartzthorstrasse, Berne; Schaefer Aktiengesellschaft, Sanitätsgeschäft, Berne; E. F. Buchi, Optische Werkstätte, Berne; Stoppani Aktiengesellschaft, Präzisionswerkstätte, 25 Neuen Königstrasse, Berne; Société des Condensateurs Électriques, Fribourg; Société de la Fabrique d'Appareils Électriques, Neuchâtel. Haaf & Co., Liebefeld bei Berne.

G. Keller, Kautschukwaren, Biel (Berne), is a wholesale dealer in rubber goods.

FRANCE RELEASES CARBON TETRACHLORIDE.

An order of the French Government, dated November 11, 1916, abrogates the prohibition of exportation of carbon tetrachloride.

This chemical was included among articles placed under embargo by a decree of October 26, 1916.

IMPORTS OF RUBBER GOODS.

The Department of Import Restrictions announces that it has been decided that where goods falling under a prohibited description are made wholly or mainly of rubber, importation into the United Kingdom is permitted under general license.

SWEDEN AND PARCEL MAILS TO RUSSIA.

We learn here that Sweden has released parcels mails between this country and Russia which were under embargo in transit through Sweden early this year. Among these parcels were 54 packages of rubber goods, chiefly rubber heels.

THE RUBBER TRADE IN GERMANY.

DESPITE the demands of the present, industrial Germany is not losing sight of the future; it is realized that international trade competition will be very keen after peace is declared. Our manufacturers foresee that they will be called upon to increase the productivity of their factories tremendously, and are already organizing for industrial preparedness.

MANUFACTURERS' TRUST

To unify and combine our efforts in the commercial struggle after the war, an important step was taken recently. The Industrial Council which has been formed, virtually unites our entire manufacturing industry. It provides a "connecting-link" between the Central Association of German Industrials, the League of German Industries and the Society of German Chemical Industries. These organizations, which have been collaborating since the outbreak of the war, now form an alliance on a permanent basis in order to coöperate in meeting new conditions after the war and to recover our lost world trade.

Rubber manufacturers are well represented in this consolidation; so also are our cable manufacturers through their syndicate.

RAW MATERIALS.

Our greatest inconvenience continues to be the shortage of raw materials. We are doing our best with this problem at the present time and not losing sight of its vital importance in preparing for the "after war." We realize that our wonderful substitute materials, however convenient they now are, will not all be of great use in peace times.

SYNTHETIC RUBBER.

The production of synthetic rubber was, of course, achieved long before the war. Bayer & Co., of Elberfeld, produced it several years ago, but it was too costly to be of real commercial value under normal conditions. Since the outbreak of the war, crude rubber has become so scarce and so costly that the synthetic product has found a ready market. Bayer & Co. continue to manufacture artificial rubber and have been joined in this line by the Franz Clouth Rheinische Gummiwarenfabrik, Cologne-Nippes. Synthetic rubber is now used in compounds for both hard and soft rubber goods. For the latter, however, it is usually employed in connection with either crude or reclaimed rubber. Of the durability of goods produced from artificial rubber, little is known, but their cost is very high; so high that they will not be able to compete with goods made with crude rubber at normal prices.

RECLAIMED RUBBER.

Reclaimed rubber continues to be much in demand and to bring really exceptional prices, especially when one considers the fact that only goods of inferior quality can be produced from it alone, without any addition of the crude product.

RATTAN TIRES.

Reclaimed rubber does fairly well for tire casings, but is practically useless for making inner tubes. Its price, as already stated, is very high for the service it gives, and this has led to many attempts to create substitutes for rubber tires.

Bicycles equipped with tires made of woven rattan were seen recently on the streets of Berlin. They are said to provide resiliency equal to that of solid rubber tires, but not so great as that of pneumatics. The sad thing about rattan tires is that rattan is not a domestic product; it is scarce and costly, although it may be possible to obtain adequate supplies of it through Turkey.

LIQUID GLOVES.

Our newspapers have been giving much space to what they term "liquid gloves" that are worn by army surgeons and their aids when performing operations or dressing open wounds. Before the surgeon begins an operation he sterilizes his hands, as usual, and then rubs over them an antiseptic solution of cellulose, which dries rapidly, forming a thin artificial skin which is entirely flexible though not so pliable as very fine rubber, which it much resembles. After the operation the cellulose can be removed quickly with warm water and certain chemicals.

From what can be learned about these "liquid gloves" they are not altogether satisfactory and are used only for short operations when suitable rubber gloves are not available. They are not sufficiently durable to enable one to undertake long operations with them, and when left any length of time on the hands they cause them to become numb and swollen. Though the daily papers have spoken of "liquid gloves" being in general use among army surgeons, this is hardly correct. It would be nearer the truth to say that these gloves are used mostly by nurses and assistants who formerly used no gloves at all.

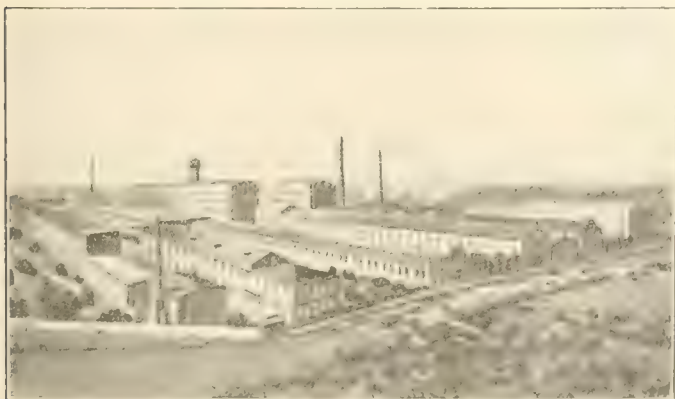
RUBBER COMPANIES AND WAR LOANS.

Our rubber manufacturers continue to be large subscribers to war loans. The Continental Caoutchouc & Gutta Percha Co., of Hanover, subscribed 5,500,000 marks [\$1,369,000] to the last war loan. Other companies subscribed in proportion to their wealth and importance.

THE SITUATION IN RUSSIA.

By A. S. Special Correspondent

THERE is a strong analogy between the economic and industrial problems of Russia today and those of the United States at the time of your Civil War. Fifty-two years ago your country was struggling for national existence, you had a colossal



SOCIETY RUBBER WORKS, Riga.

war debt, your currency was much depreciated. Yet you were on the morn of your most remarkable period of industrial and commercial development.

In the present war Russia is struggling for national life and is undoubtedly at the same time opening a new era of industrial development and material prosperity. Russia, unlike most of

the other countries engaged in this great war, has behind her huge undeveloped resources, just as the United States had half a century ago, and the drain of the present struggle stimulates us in developing these resources.

You Americans seem to know remarkably little about Russia. Of first-hand information you have very little, and you are too much inclined to imagine Russia as she was prior to the Russo-Japanese war. You forget to note the fact that between 1901 and 1914 Russia's industries had increased enormously; that her trade had doubled and that, as a consequence of both, the money in Russian banks and in circulation multiplied from \$918,000,000* to \$1,938,000,000*, an increase of about 111 per cent. During the ten years between the Russo-Japanese war and the present war, Russia's wealth was actually doubled. Bearing this absolute, fundamental fact in mind, you will be able to imagine the momentous occurrences in Russian economic life in connection with the present war.

EFFECT OF WAR ON INDUSTRIES.

Since the outbreak of the war most of our industries have been mobilized and are working for military purposes only. This mobilization has meant much to all our industries and especially to the middle-class and small industrial undertakings which have been obliged to adopt efficiency methods they never before dreamed of. It is impossible to state the quantities of goods of all kinds that have been produced here for the army, but I may mention an instance where one organization alone, from the beginning of the war up to August, 1915, produced three million pairs of army boots and more than a million pairs of snowshoes: a production all out of proportion to anything it had done before the war.

Our unprecedented industrial activity of the past two years has made domestic trade well above normal in spite of the fact that millions of men have been taken away from their homes. The buying power of our population has increased remarkably both in the cities and the rural districts.

RUBBER FOOTWEAR.

The increased prosperity of the masses and the impossibility of spending money for intoxicants, which are prohibited, have led to its expenditure for wearing apparel. Every good Russian who can afford to do so wears rubber shoes of some kind or another. Our great rubber companies owe most of their prosperity to the manufacture of footwear which, prior to the war, they supplied to millions both here and abroad.

When the war came our rubber companies had large stocks of footwear on hand and very little got out of the country before the export embargo went into effect. Although there was a temporary stoppage in the manufacture of these goods, their production is now near normal and nothing is going abroad. Russia today is probably consuming 150,000 pairs of rubber shoes each day.

RUBBER FACTORIES.

Germans, who formerly controlled and operated most of our rubber factories, have been entirely eliminated and this great industry is centering in Moscow, the old Russian capital.

The Russian-American India Rubber Co., "Treugolnik," still retains its factories in Petrograd, and the rubber reclaiming plant in Odessa, owned by an American concern, is, as far as I can learn, still in operation there, but the Russian-French India Rubber, Gutta Percha and Telegraph Works, "Prowodnik," have definitely removed their entire equipment from Riga and are now in full operation in their new Moscow establishment where they are employing more than 25,000 people, mostly Russians, who have been trained to take the place of the "Baltic labor" that was formerly employed in Riga. The Imperial Government contributed 12,000,000 rubles [\$6,180,000] towards the cost of the new plant.

The plant which the French Etablissements Bergougnan had

installed in Riga a year prior to the war, and which is known as the Société Kautschuk, has also been removed to Moscow where it is now in full operation producing tires for our armies.

RAW MATERIALS.

Our rubber factories have at no time had to suffer from any shortage of crude rubber; they had immense stocks on hand when the war broke out and have continued to receive shipments in proportion to their requirements. Chemicals and compounding ingredients have at times been very scarce, but not enough so to prevent our rubber manufacturers from maintaining their enormous production.

RUBBER WASTE.

Progress has been made in the rubber reclaiming industry here since the outbreak of the war, but the quantities of rubber scrap—mostly footwear—that are accumulating are tremendous, and prices are very low. This old rubber is being collected gradually, sorted and stored for keeping until normal conditions will permit its exportation.

Prior to the war we exported rubber waste in very large quantities to England, the United States and Germany. The last three normal years previous to the war these exports to the United States alone averaged 6,235,916 pounds in weight and \$492,425 in value per annum.

It is rumored that the Russian Asiatic Bank, probably the principal owner of our large trans-Atlantic and trans-Pacific steamship companies, is helping to finance the collection, sorting and storing of rubber waste which will be exported after the war.

NEW RUBBER CEMENT.

Unlike the soldiers of the other warring nations, most of whom travel by train or motor, the millions of our troops have to march, and the problem of keeping their feet from direct contact with the ground is no small one, especially in view of the fact that machinery for re-soling boots is rare in Russia and hand-work requires much time.

This condition of affairs led to the idea of cementing rubber patches and half-soles to worn-out soldier's boots, but this, too, was a long operation until a rubber expert discovered a cement which is not affected by variations of temperature, can be used cold, and dries so quickly that a good workman can repair from 200 to 230 boots a day.

This discovery was made in 1915 when, as a first experiment, a company of infantry of 200 men was shod with rubber soles applied to their boots with this new cement. The results were so gratifying that now there are many Russian regiments marching on rubber soles and I understand "rubber-cobblers" trained to use the new cement, will be attached to each and every company of the army.

THE RUBBER TRADE IN JAPAN.

By Our Regular Correspondent.

ACCORDING to the latest reports from the Agriculture and Commerce Department of the Japanese Government, crude rubber imports in 1915 amounted to 3,903,550 pounds valued at \$1,715,793, an increase of 1,598,288 pounds and \$708,479 over the preceding year. The imports at Kobe alone reached 2,350,376 pounds valued at \$1,608,594.

CRUDE RUBBER IMPORTS.

	1914.		1915.	
	Pounds.	Value.	Pounds.	Value.
British India	406,676	\$223,637	1,114,441	\$470,329
Straits Settlements.....	1,646,556	678,730	2,017,176	863,593
Dutch India.....	13,034	1,678	299,774	113,083
Great Britain	224,500	159,312	352,164	196,865
Germany	1,468	1,200	1,900	514
United States	11,914	8,166	98,430	58,819
Mexico			3,700	3,262
Philippines			3,976	2,235
Other Countries	1,114	581	11,989	7,098
	2,305,262	\$1,073,319	3,903,550	\$1,715,793

TIRE INDUSTRY GROWING RAPIDLY.

The increase was due to the demands of the newly established works in Tokio and Osaka and much enlarged consumption of the Dunlop Rubber Co. (Far East), Limited, the Kakuichi Rubber Co., and other leading firms. The Japanese rubber industry has been making great progress. Goods of every description are being manufactured at rather lower prices than hitherto, not only for home consumption—supplied by imports before the war—but to meet foreign demands as well. For instance, bicycle tires are now being made at 1.80 yen (90 cents) a pair, former prices being 5-6 yen (\$2.50 to \$3.00) a pair. Tire manufacturers in Tokio and Osaka have manufactured sixty to seventy thousand pairs for foreign orders and many more for jinrikishas, which were formerly imported from Germany. The Dunlop Rubber Co. (Far East), Limited, manufactured ten times the ordinary annual output of bicycle and automobile tires to fill the British orders.

CRUDE RUBBER FROM CEYLON, JAVA AND ENGLAND.

Imports of crude rubber from Ceylon increased greatly during the Singapore embargo from October, 1914, to April, 1915, but fell off again after the latter date because of the lower Singapore prices and the shorter distance to Japan. Singapore imports included plantation pale sheet, smoked sheet, mixed sheet and pale crêpe in about equal quantities. Native rubber from India and Borneo, previously much used by Japan, were not in demand because of the supply of plantation rubber.

Crude rubber from Java, never imported before, began to come in after the Singapore embargo was declared, and still continues to be imported because the prices are lower. Both smoked sheet and crêpe are received. Japanese rubber manufacturers could scarcely have maintained their output except for Japanese imports.

Crude rubber from England could be imported during the embargo, but at first little use was made of this fact because of the time required and the fear that the embargo might be removed before receipt of the British goods. During the autumn, however, large British shipments were received for the manufacture of bicycle and automobile tires for export. Crude rubber was also wanted from the United States, but American prices were higher than British and shipping facilities were not so good as from England.

The crude rubber quotations in Osaka, 1915, were as follows:

	January-April.		July-August.		November.	
	United States	Cur.	United States	Cur.	United States	Cur.
	Yen.	rency.	Yen.	rency.	Yen.	rency.
Borneo rubber...per 100 pounds ..	...	...	63.75	\$31.88	75	\$37.50
India rubber	85	\$42.50	85.00	42.50	100	50.00
Pale sheet	105	52.50	115.00	57.50	150	75.00
South American Para.....	150	75.00	140.00	70.00	160	80.00

RUBBER TIRE EXPORTS.

In 1915, tire exports amounted to 2,512,966 pounds valued at \$1,706,316, an increase of 1,630,191 pounds and \$1,163,181 over the previous year. Detailed figures follow:

	1914.		1915.	
	Pounds.	Value.	Pounds.	Value.
China	346,120	\$203,192	625,837	\$376,311
Kwanton Province	4,556	2,716	7,916	3,489
Hongkong	2,938	1,366	61,365	39,699
British India	37,756	30,720	367,318	241,452
Straits Settlements	244,470	142,086	1,008,330	730,476
Dutch India	250,224	158,327	92,545	57,537
French India	750	527	92,545	57,537
Great Britain	5,758	3,805	348,654	256,774
Siam	140	78	452	152
Germany	10	11		
United States	10,000	241		
Canada	53	66		
Australia			332	278
Total	882,775	\$543,135	2,512,966	\$1,706,316

Aside from supplying home demands the Japanese rubber industry has made great progress in the export of rubber tires and other goods to Straits Settlements and Asiatic countries supplied by European countries previous to the war. Large or-

ders have recently been shipped to Europe for military purposes. Even the Chinese, who had boycotted Japanese goods, were obliged to buy them in great quantity. Jinrikisha tires were exported to tropical lands where bicycles are almost unknown and some of them were probably re-exported to Europe for other uses by the Allied armies. Of the total tire exports, 60 per cent was jinrikisha tires and the other 40 per cent bicycle and automobile tires in nearly equal quantities. The firms engaged in this business are the Dunlop Rubber Co. (Far East), Limited, the Toyo Rubber Co., Limited, the Mitatsuchi Rubber Manufacturing Co., the Kakuichi Rubber Co., the Nihon Rubber Co., Limited, and other works. Automobile and bicycle tires for export were made principally at the Dunlop works.

Jinrikisha pneumatic tires for export are 900 by 50 millimeters, not the 43-inch size common in Japan. Automobile tires for export are mostly pneumatics 34 by 3 and 28 by 3, although some consumers order by metric measure. Bicycle tires for export are 28 by 1½ and 26 by 1½, not 1¾ as in Japan. Wired-on tires are made only by the Dunlop Rubber Co. (Far East), Limited.

Despite the high prices of crude rubber and compounding ingredients since the war, the export prices have remained relatively low, as follows:

Jinrikisha tires (including tube), per pair, 20 yen (\$10.00).

Automobile pneumatic tires, each, 35-80 yen (\$17.50 to \$40.00).

Bicycle tires, per pair, 5-13 yen (\$2.50 to \$6.50).

Tubes for bicycle tires, per pair, 1.30-2.00 yen (\$0.65 to \$1.00).

THE RUBBER TRADE IN MALAYA.

By Our Regular Correspondent.

THOUGH war has had little or no effect on the rubber plantation industry of Malaya, there are a good many who say that because of the war it is necessary to make preparations for the future. It is in the coming trade war, which the Allies are steadily bent upon, that the need of combination and organization in the industry will be felt. The chairman of a prominent rubber company recently referred to the entire lack of these important qualities while emphasizing that the need for them was never so apparent as to-day.

The purchasing of rubber, he pointed out, is getting more and more into the hands of powerful and aggressive groups who are adept in the art of depressing the market for a month or two before they make their heaviest purchases. For the trade war which is to follow upon the declaration of peace, practically every great industry is already taking steps to organize its plan of campaign, with the one great exception of the rubber plantation industry. The Germans, on their side, are not idle. They have already formed central societies which will buy for each large industry, and as regards rubber the German Empire is going to need an immense tonnage of the commodity when the war is over. Many manufacturers of rubber goods contend that for every pound of new rubber used in manufacturing rubber goods two pounds of recovered rubber are also employed. That stock of recovered rubber has run out in Germany, and the requirements of the country will be very great indeed when there is an opportunity to supply them.

It is suggested that a very simple means of helping to strengthen the rubber plantation industry is to popularize and extend advance contract sales, and thus reduce as far as possible the amounts of unsold rubber arriving on the market at any one time. As previously pointed out, when at the end of last year a number of companies found that with the rise in the price of rubber the advance contracts they had necessitated selling at less than the current market price, many thought that the advance contract policy was not a good one to continue. The idea that this method circumvents the schemes of powerful groups who can depress the market a month or two before buying is a new one, and it is certainly seems worthy of some consideration.

The Planters' Association of Malaya, the organization of the planting community, touched upon a large question at one of its recent meetings, when the secretary reported the result of his interview with the Chief Secretary to the Government on the subject of the alienation of planting land. Particulars of applications for such areas, said to have been made on behalf of various American companies, were given, and it was rightly observed that the question was a broad imperial one, upon which the association was hardly called upon to express an opinion. In so far as it went, however, the secretary's statement disclosed an attitude of distinct hostility to such alienation of land in existing circumstances, and there is probably a widespread, though unexpressed, feeling to the same effect in many other parts of the country. The government has given an assurance that no such alienations have taken place, and with that the planters may rest satisfied. No doubt the matter will be allowed to lapse until it is known how definite action one way or the other will coincide with the Imperial interests of the nation.

The industry in Malaya, by the way, has good reason to be grateful to the Federated Malay States Department of Agriculture, which is continually conducting investigations with reference to the improved production and subsequent treatment of rubber. Lectures on the subject are constantly given to planters in various states, and at a recent one, B. J. Eaton, agricultural chemist, detailed some highly interesting experiments with regard to the variability of plantation rubber. After describing the vulcanizing process, discovered independently by Goodyear in America and Hancock in England, Mr. Eaton gave a review of the results attained by the Federated Malay States Agricultural Department. These showed that the principal variability of plantation rubber was in respect to the rate of vulcanization in the case of first-grade rubber, and that differences in strength after vulcanization were of a much smaller degree.

As regards the uniformity of fine hard Para, Mr. Eaton suggested that this was due to the fact that a ball of hard Para took about two months to prepare, and thus a daily variation in the latex or the treatment to which it was subjected was averaged. One method of insuring uniformity in estate practice could be effected by mixing a sheet from each day's latex in each box over a period of a month or more.

The method of preparing rubber by keeping it in the form of coagulant for six days before machining proves to be very valuable from the viewpoint of rapid vulcanization and of quality. It is interesting to know that one of the leading American manufacturers recently asked for a consignment of about half a ton of this type of rubber for testing purposes.

NEW RUBBER EXPORTING CONCERN IN BRAZIL.

Stowell & Cia. is the name of a new concern with headquarters at Para and a branch office at Manaus, State of Amazonas, which will devote itself exclusively to the purchase and exportation of rubber, as agents for Heilbut, Symons & Co. of London and Liverpool, and Arnold & Zeiss of New York City. The members of the firm are T. B. Stowell, Albert Suter and Henri Voegeli, Mr. Suter having charge of the principal office at Para, and Mr. Voegeli being manager of the Manaus office. This new concern has no connection with the firm bearing a similar name in Liverpool. Messrs. Stowell Bros., Para, and Stowell & Sons, Manaus, which are branches of Stowell & Co., Liverpool, England, state that they continue their business as heretofore and that there is no change nor alteration in their firm names or business.

RUBBER EXPORTS FROM THE IVORY COAST.

Exports of crude rubber from the Ivory Coast during the first six months of 1916 amounted to 503,358 pounds, against 145,871 pounds exported during the corresponding period of 1915, showing an increase of 357,487 pounds.

Rubber Planting Notes.

A NEW RUBBER COAGULANT

“**COAGULATEN**” is the name of a new chemical now widely advertised in Far Eastern papers and recommended as superior to and more economical than acetic acid as a rubber coagulant. The Chemical Laboratory of the Agricultural Department of the Federated Malay States acquired a sample of Coagulatex for investigation and has published a preliminary note on the subject.

It consists of a heavy yellow-colored liquid, strongly acid, and, on analysis, found to contain sulphuric and hydrochloric acids, the latter being present in small proportion only together with a small percentage of some mineral constituent of salt.

The value of this as a coagulant depends almost entirely on the sulphuric acid, since other constituents would have little or no effect. B. J. Eaton, author of the preliminary note in question, remarks:

It is stated in the advertisement that “Coagulatex” contains no vegetable matter; the utility of this statement is somewhat doubtful, as the absence of vegetable matter is by no means an advantage. Many vegetable acids, *e. g.*, citric, tartaric acids, etc., are good coagulants, their chief drawback being cost. Acetic acid is an organic acid, *i. e.*, of vegetable origin, which is a decided advantage, since an excess of such an acid is not likely to have such deleterious effect on a substance like rubber as mineral acids like sulphuric and hydrochloric would have.

ENEMIES OF NEW PLANTATION RUBBER.

From Kalutara, Ceylon, comes the information that the white ant or termite, and a snail known as the “Kalutara snail” have been added to “bark-rot” as other enemies of plantation rubber in Ceylon.

Both the termite and the “Kalutara snail” attack the bark of the “tapping area” of rubber trees. They devour the bark to a considerable depth, but do not attack the cambium. The bark is left by them full of rough shallow cavities which spoil the tapping area. The ants cover these holes with their mud nests and build little “communication trench-like” channels leading down to their burrows in the ground. As thousands of insects contribute to the work these nests become very large, and it appears that tar applied to the attacked areas, after the destruction of the nests, is not sufficient to discourage the termites.

The most efficient method of checking the destructive work of these white ants has been to destroy their earthwork completely by pouring kerosene oil over it and setting it on fire.

The snails lay thousands of yellowish eggs, about the size of a pepper seed, which they conceal carefully at the foot of the trees on which they live. These eggs are frequently found 3 or 4 inches below the surface of the ground, in bunches of 10 to 15.

If not destroyed, these eggs hatch in a few days and tiny snails soon cover the trunk of the tree. At this stage it is an easy matter to destroy the newcomers, but once they scatter, it is almost impossible to exterminate all of them until they are large and have done considerable damage to the bark of the *Hevea* trees attacked. However, Ceylon planters are said to be successfully combating both ants and snails, which they do not consider as a very serious menace to their rubber plantations.

MEDAN RUBBER SALES.

The first sale of crude rubber under the auspices of the Medan Society for Products Trade was held in that city in September, when more than 12,000 pounds of rubber crêpe were sold at auction. These sales will continue and are to be arranged to coincide with the Java-New York steamship sailings.

RUBBER IN BRITISH NORTH BORNEO.

Rubber production in British North Borneo is increasing. The trees on estates planted five and six years ago are now ready for tapping and in various quarters large areas are being placed under cultivation.

Statistics for the year 1915, just published, show that exports of plantation rubber totaled \$1,304,863, while exports of the wild sort amounted to only \$1,908, compared with 1914, when the figures were \$897,478 and \$8,484 for plantation and wild rubber exports, respectively.

This gain of over \$400,000 in the value of rubber exported is not only evidence of the progress of the industry, but of the prosperous condition of rubber estates generally. The exports of crude rubber from North Borneo to the United States, in which the plantation sort was alone represented, amounted to \$10,489 in 1915, against \$11,503 the previous year, showing a decrease of \$1,014. This decline is not peculiar to the rubber industry, for statistics show a falling off in all exports to the United States direct, a tendency probably due to the shortage in shipping facilities.

The total exports of crude gutta percha amounted to \$5,484 and \$3,347 in 1915 and 1914, respectively.

RUBBER IN UGANDA.

The Department of Agriculture of British Uganda reports that *Hevea* rubber trees planted in 1906 are giving fair results considering the high altitude (4,500 feet) of the Kakumiro plantation where they are growing and the fact that early neglect has allowed a species of couch-grass (*Lumbugu*) to establish itself among the roots. Seed collected from the trees has been sown in nurseries and has also been distributed to various parts of the protectorate.

Manihot, planted in July, 1912, at the Kakumiro plantation, has made good growth and many of the trees were ready for tapping in 1915. Some trees planted in June, 1912, were tapped heavily during December, 1914, and January, 1915, as they were of irregular growth and it was intended to remove them. The number of trees tapped was 65, with an average girth of 19 inches at a height of three feet from the ground. They were tapped 24 times, and yielded 110 ounces of dry rubber. The flow of latex was then but small and the trees therefore were rested with a view of tapping again at a later date. (Further details on the rubber industry in Uganda were given on page 148 of the December 1915 issue of THE INDIA RUBBER WORLD.)

RUBBER AND BALATA IN BRITISH GUIANA.

The Department of Lands and Mines of British Guiana has just issued a report on mining and agriculture in the colony, covering the period from April 1 to December 31, 1915, a change having been made in the financial year to coincide with the calendar year. The financial year heretofore ended March 31.

The quantity of balata exported during the nine months was 1,188,807 pounds, which was 41,394 pounds in excess of the total production for the preceding 12 months.

Rubber exports during the nine months amounted to 3,778 pounds, against 1,932 pounds during the financial year 1914-1915. All was collected from *Hevea Brasiliensis* trees on private properties. The estimated area under rubber at the end of the year was 4,687 acres.

While at present the output of rubber from these plantations is of little importance, the production in the future will show a rapid advance as the trees now planted come into bearing, the climate and the soil being very favorable to *Hevea* trees.

Recent Patents Relating to Rubber.

THE UNITED STATES.

ISSUED OCTOBER 17, 1916.

- N**O. 1,201,252. Sectional pneumatic tire. R. L. Campbell, Columbia, S. C.
- 1,201,256. Bath-tub mat. W. H. Clarke, Los Angeles, Calif.
- 1,201,257. Tire fabric with wavy threads. H. Z. Cobb, Woburn, Mass., assignor to Revere Rubber Co., Providence, R. I.
- 1,201,282. Tire casing. G. F. Fisher, Plainfield, N. J., assignor to Morgan & Wright, Detroit, Mich.
- 1,201,307. One-piece waterproof diaper. I. M. Joseph, assignor to S. H. Shoninger—both of Chicago, Ill.
- 1,201,340. Pneumatic tire. W. M. Peabody, Chicago, Ill.
- 1,201,495. Cushion-tire. H. Paine, O. A. Widerberg and P. R. Johnson, Worcester, Mass.
- 1,201,551. Rim for vehicle wheels. R. S. Bryant, assignor to The Standard Welding Co.—both of Cleveland, Ohio.
- 1,201,556. Life saving suit having a collapsible air chamber adapted to inflation. J. Chlumsky, Chicago, Ill.
- 1,201,744. Multiple-serpentine-tread tire. F. W. Kremer, Carlstadt, N. J.
- 1,201,747. Collapsible rim for automobile tires. H. L. Lenherr and W. A. Lenherr, Mercersburg, Pa.
- 1,201,767. Massage apparatus comprising a cup-shaped soft rubber member. L. Schimek and P. Becker, Chicago, Ill.
- 1,201,808. Feed cup for milking machines. J. Hansen, assignor to Perfection Manufacturing Co.—both of Minneapolis, Minn.
- 1,201,854. Locking mechanism for vehicle wheel rims. H. Mote, Detroit, Mich.
- 1,201,859. Tire comprising a casing of metal having a tread on the surface in which the tread is embedded and secured by vulcanization. M. J. Napier, Detroit, Mich.
- 1,201,951. A feed bar for fountain pens. W. I. Ferris, Westfield, N. J., assignor to L. E. Waterman Co., New York City.
- 1,202,000. Tire shoe. W. W. McMahan, Detroit, Mich., and R. B. Price, New York City, assignors to Morgan & Wright, Detroit, Mich.

ISSUED OCTOBER 24, 1916.

- 1,202,188. Locking device for demountable automobile wheel rims and the rims. F. D. Hiller, Jr., Webster Groves, Mo., assignor to Hiller Rim Lock Co., St. Louis—both in Missouri.
- 1,202,197. Life preserver. J. W. Lippincott, assignor of one-half to C. A. Lippincott—both of Little Rock, Ark.
- 1,202,200. Armor for pneumatic tires. A. L. McNaghten, Aberdeen, S. D.
- 1,202,206. Rim for pneumatic tires. F. H. Moyer, Euclid Heights Village, Ohio.
- 1,202,207. Life preserver comprising an inflatable tube and a gas bag. K. Nebel, Chicago, Ill.
- 1,202,245. Enema bag and nozzle. G. U. Tompers, Brooklyn, N. Y.
- 1,202,295. Maternity corset, the front end section of which consists of elastic fabric. C. Leo, Boston, Mass.
- 1,202,318. Playing ball. F. T. Roberts, Trenton, N. J.
- 1,202,322. Cushion heel for shoes. W. M. Scholl, Chicago, Ill.
- 1,202,383. Golf club head. H. V. Harbison, assignor to Lee Harbison Co.—both of Belleville, N. J.
- 1,202,390. Protector for pneumatic tires. F. H. Hilsburg, New York City.
- 1,202,441. Protective automobile mat. C. W. Small, Malden, Mass.
- 1,202,490. Golf ball. C. Davis, U. S. Navy, and F. Kniffen, Wilmington, Del.; said Kniffen assignor to said Davis.
- 1,202,604. Double tube pneumatic tire. M. S. Stevenson, London, England.
- 1,202,668. Abdominal supporter comprising an elastic panel. M. E. Byrd, Mount Winans, Md.
- 1,202,695. Inner tube with ends flattened and connected by snap fasteners. F. Fenton, assignor to The Miller Rubber Co.—both of Akron, Ohio.
- 1,202,717. Necktie having a lining of sheet rubber. W. Hey, York, assignor to H. Goldstein & Co., Limited, London—both in England.
- 1,202,725. Tire protector. I. Karpen, Chicago, Ill.
- 1,202,726. Tire protector. I. Karpen, Chicago, Ill.
- 1,202,732. Cushion heel. T. B. Keogh, New York City, assignor of one-fourth to F. P. Auwcll, Brooklyn, N. Y., and one-fourth to N. P. Wedin, Jersey City, N. J.
- 1,202,738. Life preserving apparel. J. Klucina, Cicero, Ill.
- 1,202,740. A tire, both of which are connected by a cord on the top. H. P. Kraft, Ridgewood, N. J.

ISSUED OCTOBER 31, 1916.

- 1,202,820. Rubber heel. E. J. Emery, Portsmouth, N. H.
- 1,202,827. Ventilated boot or shoe. A. Gerhold, London, England.
- 1,202,845. Wheel rim. F. F. Hultgreen, South Berkeley, Calif.
- 1,202,855. Tire bead. F. W. Kremer, Carlstadt, N. J.
- 1,202,877. Anesthesia apparatus. B. Morgan, Chicago, assignor to W. F. Clark, Oak Park—both in Illinois.
- 1,202,898. Tire casing with internal springs. A. C. Salter, Bartow, Ga.
- 1,202,919. Pneumatic tire. J. D. Tew, Akron, Ohio, assignor to The B. F. Goodrich Co., New York City.

- 1,202,968. Pneumatic tire shoe. I. W. Cole, Plainfield, N. J.
- 1,202,991. Pneumatic tire. J. Girard, Montreal, Quebec, Canada.
- 1,202,993. Hose coupling. E. H. Gold, Chicago, Ill.
- 1,203,020. Cushion block tire. T. Barnes, Denver, Colo.
- 1,203,134. Wheel rim. J. T. Ronald, Seattle, Wash.
- 1,203,160. Rubber-covered garter button. A. T. Van Alstyn, New York City.
- 1,203,243. Anesthetizing device for wheel tires. J. H. Mc... and L. D. Snover, Waterford, Mich.
- 1,203,329. Stethoscope with rubber tubing. C. M. Heck, Raleigh, N. C.
- 1,203,458. Cushion block tire. T. Barnes, Denver, Colo.

ISSUED NOVEMBER 7, 1916.

- 1,203,570. Rubber key top for typewriters. R. E. Deaubien, Chicago, Ill.
- 1,203,648. Solid tire attachment. M. C. Overman, New York City.
- 1,203,654. Inner tube. L. R. Schaap, Longmont, Colo.
- 1,203,762. Gasket comprising metal and rubber. C. I. E. Mastin, Midland Park, N. J.
- 1,203,898. Pneumatic cushion wheel. O. Mussinan, New York City.
- 1,203,910. Vehicle tire. A. J. Savage, assignor to The Savage Tire Co.—both of San Diego, Calif.
- 1,203,915. Tire with rubber tread and cork body. E. Schmitt, New York City.
- 1,203,985. Pneumatic tire armor. S. T. Culp, Littleton, Colo.
- 1,204,007. Packing for pump rods. B. W. Goodsell, Chicago, Ill.
- 1,204,010. Tire rim. E. Hopkinson, East Orange, N. J.
- 1,204,100. Tire casing with replaceable tread. O. Zarth, assignor of one-half to W. H. McCullough—both of Aurora, Ill.
- 1,204,125. Bottle stopper and rubber dropper. E. J. Brosnan, Troy, N. Y.
- 1,204,237. Cap for fountain or other syringes. E. H. Bickley, Pittsburgh, Pa.
- 1,204,352. Overshoe. C. W. MacWilliams, Geneva, Nebr.
- 1,204,352. Hose coupling. F. Hachmann, assignor of one-fourth to F. C. Schoenthaler—both of St. Louis, Mo.
- 1,204,365. Rubber boot. C. Lee, assignor to The Goodyear's Metallic Rubber Shoe Co.—both of Naugatuck, Conn.

DOMINION OF CANADA.

ISSUED AUGUST 31, 1916.

- 171,134. Demountable rim. H. J. Trares, Edwardsville, and A. S. Winey, Mishawaka, assignee of a half interest—both in Illinois.
- 171,184. Anti-slipping device for tires. I. C. Hess, Emlenton, Pa.
- 171,208. Nipple. M. H. McMann, New York City.
- 171,273. Non-skid tire chains. W. R. Lasher, Bridgeport, Conn., assignee of H. B. Weed, Syracuse, N. Y.
- 171,276. Corset comprising a plurality of elastic strips. L. J. A. Amyot, Quebec City, Quebec, Canada.
- 171,396. Bust form comprising elastic bands. M. V. Heuchan, Los Angeles, Calif.
- 171,403. Cushion tire. F. H. Hilsburg, New York City, assignor to F. H. Hilsburg & Co., New York City, assignee of W. B. Estes, Newark—all in New Jersey.
- 171,444. Pneumatic tire with puncture proof plate. Gutta Percha & Rubber, Limited, Toronto, Ontario, Canada, assignee of C. C. Ferry, Middlebury Center, Pa.
- 171,461. Pneumatic tire casing. R. M. Merriman and A. Micheler, assignee of a half interest—both of Akron, Ohio.
- 171,462. Pneumatic tire with cushion tread. J. C. Markle and C. F. Nast, assignee of a half interest—both of Seattle, Wash.
- 171,469. Tire tread of rubber and blocks of rigid material. W. T. Bogan and W. W. Porter, assignee of a half interest—both of Philadelphia, Pa.
- 171,471. Pneumatic tire with partitioned tube. W. C. Cole and M. F. Stewart, assignees of a half interest—both of Coronation, Alberta, Canada.
- 171,475. Pneumatic tire and molded tube. H. C. Boggs, Decatur, Ala.
- 171,483. Pneumatic cord tire. C. L. Archer, Minneapolis, Minn.
- 171,509. Tire casing tube and rim. E. H. Herrick, New York City.
- 171,518. Pressure control for tires. E. B. Keith, Pontiac, Mich.
- 171,527. Tire liner. J. C. Mooney, Erie, Pa.
- 171,529. Pneumatic tire. W. D. McNaull, Toledo, Ohio.
- 171,532. Pneumatic tire with tread band comprising spirally coiled strands. L. R. Poschadel, Milwaukee, Wis.
- 171,536. Metal inner tube. W. F. Stewart, Pekin, Ill.
- 171,537. Solid tire and rim. W. E. Supernaw, Elgin, Ill.
- 171,585. Rubber glove. J. D. Garvey, Chicago, Ill.
- 171,598. Tire holder. C. L. Keves, Peru, Ind.
- 171,600. Tire holder. C. L. Keves, Peru, Ind.
- 171,601. Tire holder. C. L. Keves, Peru, Ind.
- 171,602. Tire holder. C. L. Keves, Peru, Ind.
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- 171,619. Tire holder. C. L. Keves, Peru, Ind.
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- 171,621. Tire holder. C. L. Keves, Peru, Ind.
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- 171,699. Tire holder. C. L. Keves, Peru, Ind.
- 171,700. Tire holder. C. L. Keves, Peru, Ind.

THE UNITED KINGDOM.

PATENT SPECIFICATIONS PUBLISHED.

In order to give the public the benefit of having abridgements of specifications of patents made subsequent to 1915 are given new numbers when their complete specifications are accepted, or become open to public inspection before acceptance. The new numbers start with No. 100,001 (without any indication of date), and supersede the original application numbers in all proceedings after acceptance of the complete specifications.

[ABSTRACTED IN THE ILLUSTRATED OFFICIAL JOURNAL, OCTOBER 11, 1916.]

- 9,103 (1915). Combining damaged tire treads to form one good cover. J. B. Gay, 27 Alhambra avenue, Toronto, Ontario, Canada.
- 9,160 (1915). Elastic band for attaching a mirror to the head of a chauffeur, cyclist, jockey, etc. S. H. Gollan, 9 Portchester Gate, London.
- 9,199 (1915). Teat cup for milking machine. J. Treloar, Victoria street, Hamilton, Auckland, New Zealand.
- 9,257 (1915). India rubber springs. R. T. Glascodeine, 77 Canon street, London.
- 9,263 (1915). Shoe with a rubber and canvas tread band. T. Whitehead, Bela Grove, Blackpool, Lancashire.
- 9,286 (1915). A hollow heel for use on a shoe in which a layer of india rubber covers the bottom of the heel. E. Magalhães, 10 Via Visconti, Milan, Italy.
- 101,161. Spring wheel with pneumatic hub and rubber cushions. M. F. Kettler, Houston, Texas.
- 101,177. Pneumatic hub with rubber cushions. J. Greppi and A. Romanach, 1411 Sarmiento street, Buenos Aires.

[ABSTRACTED IN THE ILLUSTRATED OFFICIAL JOURNAL, OCTOBER 18, 1916.]

- 17,751 (1914). Tire consisting of an elastic core covered by wire. P. E. H. Forsans, 10 Rue du Pont-Neuf, Brussels.
- 5,951 (1915). Heel breast burnishing tool composed in part of rubber. J. Gouldbourn, and British United Shoe Machinery Co., Union Works, Belgrave Road, Leicester; and E. Eaves, 33 Dorset street, Wolverhampton.
- 9,318 (1915). Wheel with solid rubber tire and pneumatic cushion. C. A. James, Prescott Terrace, Rose Park, and F. F. Milford, Portrush Road, Toorak—both in South Australia.
- 9,319 (1915). Improvement in diving suit valve. Neufeldt & Kuhnke, Werk Ravensberg am/Habsburger Ring, Kiel, Germany.
- 9,404 (1915). Cushion tire. A. S. Miesch, 40 Crompton Road, Handsworth, Birmingham.
- 9,435 (1915). Athletic blouse with elastic waist band. A. Perry, Behring House, Argyll Place, Regent street, London.
- 9,440 (1915). Tire built up of blocks of rubber and enclosed in a cover. E. J. Mitchell, 55 Harman street, Brooklyn, N. Y.
- 101,232. Toy in which pieces of elastic stretched on a frame produce a musical note when swung through the air. A. J. Herne, 41 Berners street, Oxford street, London.
- 101,241. Reservoir pens. D. Cameron, Waverley Works, Blair street, Edinburgh.
- 101,257. Hose coupling. G. J. Winter, 686 East Utica street, Buffalo, N. Y.

[ABSTRACTED IN THE ILLUSTRATED OFFICIAL JOURNAL, OCTOBER 25, 1916.]

- 9,640 (1915). Explosive shells comprising an inner packing of cork and rubber. P. Pomeon and J. Pomeon (trading as Pomeon et ses Fils, A.), Saint Chamona (Loire), France.
- 9,699 (1915). Rubber rollers in apparatus for painting metal sheets. H. Folland, Brandeg, and W. Griffiths, 2 High street—both in Glamannan, Carmarthenshire.
- 9,737 (1915). Puncture repairing plug for pneumatic tires. F. Merricks, 5 Great Winchester street, London.
- 9,827 (1915). Elastic webbing used to accommodate a hat to heads of different sizes. F. E. English and M. G. Wiener, 1700 Washington avenue, St. Louis, Mo.
- 9,867 (1915). Tire inflating valve. H. S. Land, 75 Old Road, Lee, Kent.
- 101,294. Metal tread bands for pneumatic tires. T. Duysens, 21 Gubbelstraat, and R. Hustinx, 10 Spoorweglaan—both in Maastricht, Holland.
- 101,317. Cushion tire. J. C. Anderson, Cochran Hotel, Fifteenth street, Washington, D. C.
- 101,320. Means employing rubber for retaining dentures in the mouth. G. E. Arnold, 67 West Hill street, St. Leonard's-on-Sea; H. H. Arnold, Northlands, Hollington, Hastings, and J. C. Arnold, 2 The Haven, Sandhurst Lane, Little Common—all in Sussex.
- 101,323. Inflated rubber lining for footwear and other wearing apparel. R. Harradine, Broad Street House, New Broad street, London.
- 101,328. Reservoir pens. C. H. Dunn, "Bank" House, Kew, Surrey.
- 101,341. Rubber pad device for cleaning safety razor blades. C. J. Kennedy and W. W. Blackshaw, 318 West Second street, Duluth, Minn.

[ABSTRACTED IN THE ILLUSTRATED OFFICIAL JOURNAL, NOVEMBER 1, 1916.]

- 10,041 (1915). Puncture preventing metal band to be inserted between the air-tube and outer cover of a tire. J. G. Jorgensen, 1 Jyllandsgade, Horsens, Denmark.
- 10,082 (1915). An artificial ankle without joints, tendons or pivots comprising a rubber block. J. B. Hilliard, 157 Hope street, Glasgow.
- 10,132 (1915). Motor vehicle wheel with a flanged rim for use on rails, and a rim of lesser diameter on which a pneumatic tire is secured for use on ordinary roads. C. A. Dunham, 689 Asylum avenue, Hartford, Conn.

- 10,197 (1915). A rubber and canvas protective band for insertion between the air tube and cover of a wheel tire. R. W. David, 1340 Westmoreland street, Philadelphia, Pa.
- 10,220 (1915). Rubber in automatic vent valves. A. E. Bezant, 11 Leonard Road, Landport, Portsmouth.
- 10,230 (1915). Automobile belt. P. A. E. Haure, 3 Rue Mirepoix, Toulouse, France.
- 10,253. An outer fabric cover for pneumatic tires. F. Duysens, 21 Gubbelstraat, and R. Hustinx, 10 Spoorweglaan—both in Maastricht, Holland.
- 101,401. Hose joint. T. Wood and M. Wood, 35 Mauldeth Road, Withington, Lancashire.

THE FRENCH REPUBLIC.

PATENTS ISSUED With Dates of Application

- 480,550 (December 14, 1915). Automatic life-belt with watertight compartments. J. Insarum.
- 480,580 (December 30, 1915). Cylindrical chamber closed by a press-button. Proust and Bonnin.
- 480,590 (April 10, 1915). Tread surface of wheel formed by supporting rubber cones. J. Spyker.
- 480,618 (October 19, 1914). Protective device for solid rubber and pneumatic tires. W. Ditzmann.
- 480,681 (January 13, 1916). Elastic wheel. J. Ollagnon.
- 480,716 (January 13, 1916). Improvements in pneumatic tires. M. J. Stevenson.

TRADE-MARKS.

THE UNITED STATES.

- 93,724. Representation of a swan-shaped automobile and chauffeur against a scenic background above the words SWANSON SUPPLY CO., on the automobile the word PNEUMATIC and below TRADE MARK—adhesive material used for repairing rubber goods, especially rubber tires. A. Swanson, Seattle, Wash.
- 94,010. Representation of a head and shoulders, and below the words LADY CLARE—dress-shields. Forbes & Wallace, Springfield, Mass.
- 95,440. The word DUNHAM—rubber linings, etc. The Dunham Mills, Inc., Hartford, Conn.
- 96,964. The word WALKONAIR—shoe heels. A. L. Runyan, Waterloo, Iowa.
- 97,112. The word HOPSIES—inflatable rubber toys, balls, balloons, etc. G. Borgfeldt & Co., New York City.
- 97,164. The words WHY NOT—golf balls. W. T. Henley's Telegraph Works Co., Limited, London Wall, London, England.
- 97,235. Two oval lines, one within the other, in the center the word CHARLOTTE, between the lines the words JONES' OFFICIAL SKATING BOOT—boots and shoes with rubber, felt and leather soles. George R. Jones Co., Manchester, N. H.
- 97,390. The word RIB-SKID—pneumatic rubber automobile tires. Beacon Tire Co., Inc., Beacon, N. Y.
- 97,550. The word TEXTAN—soles composed partly of rubber, for boots and shoes. The B. F. Goodrich Co., New York City.
- 97,552. Two circles, one within the other, and across the center the representation of a shoe sole—soles composed partly of rubber for boots and shoes. The B. F. Goodrich Co., New York City.
- 97,576. The words WHY and NOT forming a circle around a mark of interrogation—golf balls. W. T. Henley's Telegraph Works Co., Limited, London Wall, London, England.
- 97,740. Representation of two medals, one on each side of the words GOLD MEDAL—elastic tapes. Samstag & Hilder Bros., New York City.
- 80,838. Representation of a rubber boot consisting of a narrow white band around the upper edge of the boot, and the body being of a contrasting color—rubber boots. The B. F. Goodrich Co., New York City, and Akron, Ohio.
- 80,839. Representation of a rubber boot consisting of a narrow green band around the upper edge of the boot, the body being of a contrasting color—rubber boots. The B. F. Goodrich Co., New York City, and Akron, Ohio.
- 80,840. Representation of a rubber boot consisting of a blue band around the upper edge of the boot, the body being of a contrasting color—rubber boots. The B. F. Goodrich Co., New York City, and Akron, Ohio.
- 96,845. The word PHYBUR—a rubber composition in the shape of soles and heels for shoes. The Manhattan Rubber Manufacturing Co., New York City.
- 96,846. The word PARANITE—belting made partly of rubber and partly of cotton. The Manhattan Rubber Manufacturing Co., New York City.
- 97,269. The word SAFETY—rubber gloves for domestic use. F. Chapman, Providence, R. I.
- 97,642. The words BLUE STEEL—rubber boots and shoes, overshoes, and rubber sole canvas shoes. Hood Rubber Co., Watertown, Mass.
- 97,932. The words FLINT ROCK—rubber overshoes and boots. Sears, Roebuck & Co., Chicago, Ill.
- 94,224. Representation of a wheel and pneumatic tire and in the center the word AUTIFI—tire fillers. The Autifi Co., San Francisco, Calif.
- 96,826. The word DELHI—belting, hose and machinery packing made partly of rubber and partly of cotton. The Manhattan Rubber Manufacturing Co., New York City.
- 96,830. The word FULTON—hose and machinery packing made partly of rubber and partly of cotton. The Manhattan Rubber Manufacturing Co., New York City.
- 96,939. The word KEDS—rubber, leather, and fabric boots and shoes. United States Rubber Co., New Brunswick, N. J.

- 97,391. The word BEAN—rubber, belting, hose and packing. The Bean Tire Co., Inc., Bean, N. Y.
- 97,496. The word BEAN—rubber, belting, hose and packing. The Cincinnati Rubber Manufacturing Co., Norwood, Ohio.
- 97,497. The word CINCINNATI—rubber, belting, hose and packing. The Cincinnati Rubber Manufacturing Co., Norwood, Ohio.
- 97,499. The word ARN—rubber, belting, hose and packing. The Cincinnati Rubber Manufacturing Co., Norwood, Ohio.
- 97,500. The word NORRA—rubber, belting, hose, packing, and fruit jar rings. The Cincinnati Rubber Manufacturing Co., Norwood, Ohio.
- 97,501. The words OLD CROW—rubber, belting, hose, packing and fuller-balls. The Cincinnati Rubber Manufacturing Co., Norwood, Ohio.
- 97,504. The word FRUIT—rubber, belting, hose, packing, and fruit jar rings. The Cincinnati Rubber Manufacturing Co., Norwood, Ohio.
- 97,597. The words PACE MAKER—rubber, belting and hose. The Cincinnati Rubber Manufacturing Co., Norwood, Ohio.
- 88,742. Picture of a man stepping over a boot, and the words WALK OVER—boots and shoes of rubber, etc. G. E. Keith Co., Brockton, Mass.
- 93,733. Representation of a piece of wire with two longitudinal ridges—insulated wire. Atlantic Insulated Wire & Cable Co., Jersey City, N. J.
- 94,741. The word GENERAL—rubber tires, tire casings, and inner tubes for pneumatic tires. The General Tire & Rubber Co., Akron, Ohio.
- 97,244. The word TATELEC—waterproofed fabric. Tate Electrolytic Water Proofing Co., Inc., New York City.
- 97,245. The word TATELEC—waterproofed threads and yarns. Tate Electrolytic Water Proofing Co., Inc., New York City.
- 97,978. The word PENSLAR—hot-water bottles and fountain-syringes. Peninsular Chemical Co., Detroit, Mich.

THE DOMINION OF CANADA.

- 21,920. Word OUTING in script type with a flourish beneath on which the words TRADE MARK appear, below being displayed the initials G. P. & R. LTD.—footwear constructed wholly or in part of rubber, rubberized fabrics or rubber substitutes. Gutta Percha & Rubber Limited, Toronto, Ontario.
- 21,922. The word AVON—types of india rubber. The Avon India Rubber Co., Limited, Rubber Works, Melksham, Wiltshire, England.

THE UNITED KINGDOM.

- 372,795. A blue flag with a white cross in its field, Chinese characters and the word Ewo, their phonetic rendering in English—balata machine belting. Matheson & Co., Limited, London, E. C.
- 373,606. A drawing showing tires before and after being repaired, with the signature of Charles P. Salisbury, and the words BEFORE AND AFTER—vulcanized rubber tires and tubes and materials for repairing such tires and tubes. Salisbury's Tyre Repairing Co., Cardiff, Wales.
- 371,985. The drawing of a car with the word CRAYLE—rubber goods, including tires. Components, Limited, Birmingham.
- 372,725. The word CLINCHER—rubber substitute of vegetable composition. The North British Rubber Co., Limited, Edinburgh.
- 372,939. A label comprising a thistle, scales and swords, and the words DENTAL GOLDEN FLEECE RUBBER—vulcanite in sheets for forming plates of artificial teeth. The North British Rubber Co., Limited, Edinburgh.
- 373,438. The word MATTA—tires and tire treads, and goods of like kind, made of rubber. Pearson Brothers, Bournemouth.
- 373,446. The word WHIFFLE—golf ball. A. S. Spalding & Bros., Limited, Putney, London, S. W.
- 373,776. The word SLEUTH—cycle and motor cycle tires of rubber. J. G. Graves, Limited, Sheffield, Yorkshire.
- 373,905. The word NICO—balata soles for boots and shoes. Norman Isherwood & Co., Bolton, Lancashire.

THE FRENCH REPUBLIC.

- 165,321. The word COCORICO—rubber tobacco pouches. Mathis, Paris.
- 165,379. The name LE FOURIER—military pouch for proofed material. Jeanne Mortagne, Paris.
- 165,400. The word FACTOR—rubber heels. Société Cousin et Cie., Levallois-Perret, Seine.
- 165,419. The number "520"—rubber tobacco pouches, suspenders, general rubber goods. Arnoux, Paris.
- 1,371. The word FLAMPEAU—rubber tobacco pouches. Cernoy-Veignet, Saint-Clément, Jura.
- 1,372. The word TAMARIS— Same.
- 1,373. The word TRIANON— Same.
- 1,374. The words LA DANIELA— Same.
- 1,375. The word ORSY— Same.
- 1,376. The word NELSON— Same.
- 1,377. The word MONTMARTRE— Same.
- 1,378. The word MUSARDISE— Same.
- 1,379. The word OXFORD— Same.
- 1,380. The word TOURNON— Same.
- 1,381. The word SOFT— Same.
- 24,085. The word FIRESTONE—all kinds of rubber goods. The Firestone Tire & Rubber Co., Akron, Ohio.
- 162,279. The word RUBY—rubber erasers. Léon Reboul, Paris.
- 162,280. The words ROYAL DIAMANT— Same.
- 162,281. The words ROYAL RUBBER— Same.
- 162,282. The word PARA— Same.
- 162,283. The word NÉOLINE— Same.
- 162,713. The word PARLO—waterproofed garments. P. Duño, Paris.
- 162,740. The words LE BLINDÉ—tires. François Delboye, Paris.
- 162,741. The word PHÉBUS—water-proofed sleeping bags. Léon Dupuis, Paris.

NEW ZEALAND

- 13,356. The word RONOLEKE—water bottles, air and water beds, cushions, and pillows manufactured from india rubber. The Firm Trading as Sangers, 258 Euston Road, London, N. W., England.
- 13,380. The word HIPRESS—rubber boots and shoes. The B. F. Goodrich Co., New York City.

DESIGNS.

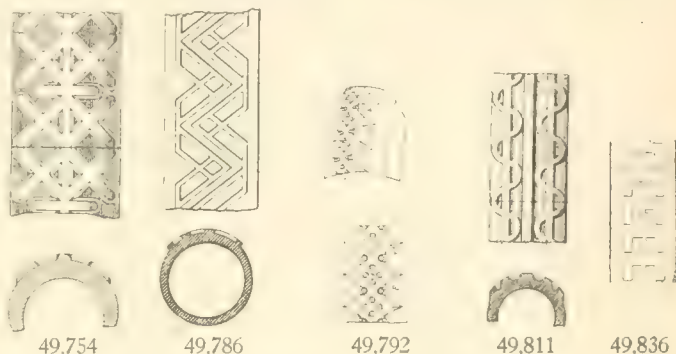
THE UNITED STATES.

- 49,763. Rubber brush. Term 14 years. Patented October 17, 1916. O. Eick, St. Louis, Mo.
- 49,764. Rubber brush. Term 14 years. Patented October 17, 1916. O. Eick, St. Louis, Mo.
- 49,797. Ornamental design for a sign or similar article. Term 14 years. Patented October 24, 1916. R. Griffith, Akron, Ohio.

DESIGNS FOR TIRES.

UNITED STATES.

- 49,754. Vehicle tire. Term 3½ years. Patented October 17, 1916. E. P. Altenberg, East Palestine, Ohio.
- 49,786. Tire tread. Term 14 years. Patented October 17, 1916. W. S. Vorhis and V. A. Parker, Akron, Ohio, assignors to The B. F. Goodrich Co., New York City.
- 49,811. Vehicle tire. Term 14 years. Patented October 24, 1916. G. W. Beldam, Ealing, England.



- 49,811. Tire. Term 3½ years. Patented October 24, 1916. C. A. Westover, Youngstown, Ohio.
- 49,836. Vehicle tire. Term 14 years. Patented October 31, 1916. E. H. Trump, assignor to The Sebring Tire & Rubber Co.—both of Sebring, Ohio.

NEW TYPE OF DIRIGIBLE BALLOON.

The war has developed in Europe a new type of dirigible balloon which is being used in great numbers. This consists of what is practically an aeroplane body with its motor and propeller supported by a cigar-shaped gas bag made of rubberized fabric about 130 to 175 feet long and from 30 to 40 feet in diameter at its widest point; it has places for 4 passengers, carries fuel for 6 hours, can climb to an altitude of approximately 3,000 feet and has the ability to travel 60 miles per hour.

Naturally the radius of action of these small dirigibles is limited as compared with that of Zeppelins, but they are well suited to patrolling at night when the use of aeroplanes is difficult, owing to the necessity to keep going while in the air and the dangers of landing at high speed in the dark.

Night is ideal for dirigibles, as the temperature is usually constant and not subject to fluctuations which occur in the day when the sun may shine at one moment and a little later be hidden by clouds, thus affecting the volume of gas in balloons and disturbing their equilibrium. At night a dirigible can navigate silently and keep sharp lookout for hostile machines.

The new type of dirigible here mentioned is widely used by the Entente Allies for sea patrol and has proved to be very useful for detecting submarines and for general harbor and navigation defense work. The fabric of the supporting part is both gas and waterproof, and the machines can be anchored in the open or housed in comparatively small sheds.

It appears that balloons of this type might be successful in this country for both military and pleasure purposes. They are said to cost about 60,000 francs [\$12,000], and for more than 18 months have been patrolling the English Channel, collaborating with destroyers in protecting the troops traffic between England and France.

Review of the Crude Rubber Market.

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NEW YORK

THE upward trend in the market that commenced late in October, continued through November, and prices have steadily advanced. All grades of crude rubber have been in good demand, which is believed to emanate from the manufacturers, although dealers' transactions have been equally active. That the market will experience the same violent fluctuations that commenced a year ago this month and ended December 30, in dollar rubber, is wholly speculative. Such disturbances are harmful to the trade in general and experience will doubtless caution the large interests in controlling the market.

Actual information concerning the restriction of London permits is not obtainable, but shipments from that port for some reason have been delayed.

On November 1, Upriver fine, spot, sold in a firm market for 63 to 63½ cents; Smoked sheet ribbed, spot, 63 cents; Amber light, spot, 60 cents, and Upriver fine, spot, was firm at 83 cents. As the month progressed the cabled reports of London's firm position were reflected in the New York market and prices continued upward. The volume of business gradually increased and toward the end of the month trading was quite lively. Spot quotations on November 27 were as follows: First latex, 70 cents; Smoked sheet ribbed, 70 cents, and light Amber, 68½ cents. Para sorts were easier, with Upriver fine at 81 and Upriver coarse at 47½ cents. There was little difference in plantation spot and future prices, and the producers refuse to sell at present levels. It is reported that forward sales are smaller for 1917 than any previous year.

LONDON.

Market conditions, generally, have been firm during the past month with periods of marked activity and fluctuations that have finally resulted in higher price levels. The loss of the "Arabia," early in the month, with 350 tons of rubber on board, had a tendency to support the advancing market. Supplies have not been plentiful, due, possibly, to restricted permits at Singapore and lack of cargo space, and while the London stocks on November 1 were 10,000 tons, the government's requirements of at least 5,000 tons must be taken into consideration. Moreover, England's crude rubber consumption is sure to increase under the proposed plan of industrial expansion now being propagated.

London imports for October were 3,835 tons, against 6,000 tons for September. Liverpool imports for October were 1,143 tons, against 1,160 tons for September.

SINGAPORE.

By mail advices we learn that the export restrictions have had the effect of reducing prices on this market and available supplies were bought up by the dealers. The strong demand for forward positions that followed was met with refusal on the part of the planting companies to sell at artificially depressed prices.

The result of the auctions held November 3, 10, 20 and 25 was as follows: Pale crépe averaged 62.0 cents and Smoked sheet 60.3 cents, showing an average gain during the month of 7.8 cents for Pale crépe and 6.7 cents for Smoked sheet. The amount sold was 1,827 tons, as compared to 2,555 tons a month ago.

PALE CRÉPE.

There was good demand for all grades of plantation rubber at the November auctions with pale crépe leading. Considerable spot rubber was sold in an advancing market. Futures were very dull due to the apathy of the producers. Later in the month the market became very active and prices advanced.

NEW YORK QUOTATIONS.

Following are the quotations at New York one year ago, one month ago, and November 28, the current date:

Grade	Dec. 1, 1915.	Nov. 1, 1916.	Nov. 28, 1916.
Upriver, fine, new...	83	83	83
Upriver, fine, old...	83	83	83
Islands, fine, new...	72	72	72
Islands, fine, old...	72	72	72
Upriver, coarse, old...	47	47	50 @
Upriver, coarse, new...	47	47	31 @ 32
Cametá, fine, old...	35	32 @	33
Cametá, fine, new...	58	58	51
Cametá, ball, low...	44	@ 45	47 @ 48

PLANTATION

First latex	73 @
Smoked sheet, ribbed	73 @
Smoked sheet, plain	71 @
Brown crépe, clean	58 @
Smoked sheet, ribbed	73 @
Fine sheets and biscuits	73 @

CENTRALS.

Esmeralda, sausage	54 @ 55	44 @	47 @
Mexican plantation, sheet	45 @	45 @	49 @ 50
Mexican, ball	42 @	42 @	45 @ 46
Mexican, sheet	32 @	32 @	33 @ 34
Mexican, ball	32 @	32 @	45 @
Mexican, sheet	32 @	32 @	40 @
Balata, sheet	56 @	69 @	74 @
Balata, ball	61 @	61 @	65 @ 65½

AFRICA.

Lopori, ball, prime	55 @ 56	55 @ 56	62 @ 63
Lopori, strip, prime	55 @ 56	55 @ 56	62 @ 63
Upper Congo, ball, red	54 @	54 @	63 @ 64
Lower Congo, ball, red	55½ @ 56	55½ @ 56	58 @ 60
Massai, red	4 @ 4½	4 @ 4½	55 @ 57
Cameroon, ball, soft	40 @	40 @	40 @
Cameroon, ball, hard	46 @ 48	46 @ 48	40 @ 41
Bombay, ball, soft	39 @	39 @	39 @
Bombay, ball, hard	33 @	33 @	23 @

ASIA.

Assam, ball, soft	13 @	13 @	13 @
Assam, ball, hard	13 @	13 @	13 @
Assam, sheet	13 @	13 @	13 @
Assam, ball, soft	13 @	13 @	13 @
Assam, ball, hard	13 @	13 @	13 @
Assam, sheet	13 @	13 @	13 @

MARKET CABLE SERVICE FROM LONDON

The following reports of the weekly auctions held from Aldens' Successors, Limited, London:

Date.	Standard Crépe.	Smoked Sheet.	Market.
October 3	59.4	59.4	There were buyers.
November 3	59.4	59.4	There were buyers.
November 10	62.3	62.3	There were buyers.
November 25	62.3	62.3	There were buyers.

MARKET CABLE SERVICE FROM SINGAPORE

The following reports of the weekly auctions held at Singapore have been cabled by The Waterhouse Co., Limited:

Date.	Crépe. Price per lb.	Smoked Sheet. Price per lb.	Pounds Sold.	Market.
Nov. 3..cents	59.0	59.0	1,002,480	Good demand for all descriptions, prices advancing.
Nov. 10.	62.0	62.0	1,016,960	Good demand for all descriptions.
Nov. 20.....	62.0	62.0	862,400	Dull; supplies are large.
Nov. 25.....	65.0	62.0	1,200,640	Very active.

COMPARATIVE NEW YORK PRICES FOR OCTOBER.

In regard to the financial situation, Albert B. Beers (broker in crude rubber and commercial paper, No. 68 William street, New York) advises as follows:

There has been a slight improvement in the demand for November from the conditions prevailing in October, the demand having continued good, with the best rubber names selling at 4@4½ per cent, and those not so well known 4½@5 per cent, and some 5½ per cent.

	1916.*	1915.	1914.
Upson, fine	50.7	50.7	50.3
Upson, fine	50.7	50.7	50.3
Islands, fine	.69@.72	.54@.67	.50@.61
Islands, coarse	.30@.32	.27@.34	.27@.32
Sumatra	1.00	1.00	1.00

*Figured only to November.

SINGAPORE.

GUTHRIE & CO., LIMITED, Singapore, report [October 5, 1916]:

A strong demand was again experienced when the sale was resumed this morning. Standard sheet sold up to \$124, an increase of \$1 from yesterday's best. Standard crepe was unchanged. Medium and lower grade crépes were if anything slightly higher and all parcels sold readily. Of 654 tons offered 456 tons changed hands. The following was the course of values:

	In Singapore per picul.*	Sterling equivalent per pound in London.	Equivalent per pound in cents.†
Sheet, fine ribbed smoked...	\$120@124	4.00	58.28@59.80
Sheet, good ribbed smoked...	116@120	3.90	56.50@58.28
Sheet, plain smoked...	105@118	3.10	51.70@52.77
Sheet, ribbed unsmoked...	100@113	2.90	53.46@55.24
Sheet, plain unsmoked...	105@110	3.10	51.70@53.97
Crépe, fine pale	114@125	3.90	59.80@60.31
Crépe, good pale	117@124	4.00	57.01@59.80
Crépe, fine brown	116@119	3.90	56.50@57.77
Crépe, good brown	107@115	3.80	52.70@56.00
Crépe, dark	90@110	3.10	45.35@53.46
Crépe, bark	57@104	1.30	31.42@51.43
Scrap, virgin	73@94	1.00	38.26@47.13
Scrap, pressed	82@100	1.80	40.00@46.37
Scrap, bark	50@80	1.00	28.38@46.37

* Picul = 133½ pounds.

† Figured at standard rate of exchange, 1s. = 24.3 cents.

Quoted in S. S. dollars = 2/4 [56.7 cents].

PLANTATION RUBBER FROM THE FAR EAST.

TOTAL EXPORTS FROM MALAYA.

(From January 1, 1916, to latest date. Reported by B. I. W. & Co., Singapore. These figures include the production of the Federated Malay States, but not of Ceylon.)

To—	From Singapore, August 31, 1916.	From Malacca, August 31, 1916.	From Penang, August 31, 1916.	From Port Swet- tenham, September 1, 1916.	Totals.
United Kingdom...	20,358,178	4,639,630	15,494,701	20,679,766	61,172,275
The Continent	7,584,882				7,636,082
Japan	2,607,293				2,607,293
Ceylon	51,700		413,733	1,178,941	2,174,293
United States	54,263,194		7,428,133	1,301,867	62,993,194
Australia	2,001				233,081
Totals	85,628,247	4,639,630	23,387,767	23,160,574	136,816,218
For same period, 1915	88,334,291	5,346,805	18,184,930	21,276,328	93,142,354
For same period, 1914	25,420,119	3,234,581	13,801,332	20,637,311	63,093,343
For same period, 1913	16,353,430		9,939,467	19,946,488	46,239,385

EXPORTS OF CEYLON GROWN RUBBER

(From January 1, 1916, to latest date. Reported by the Chamber of Commerce.)

To—	1915.	1916.
Canada and Newfoundland	384,940	6,720
Russia	332,200	248,874
United Kingdom	18,561,024	16,404,892
Australia	621,977	756,361
Straits Settlements	119,933	43,680
Japan	245,211	256,789
Totals	32,382,561	39,234,976

(Same period 1914, 25,744,812 pounds; same period 1913, 19,161,808.) The export figures of rubber, given in the above table for 1914, include the imports re-exported. (These amount to 2,410,071 pounds from the Straits Settlements and 572,684 pounds from India.) To arrive at the total quantity of rubber exported from Ceylon, the above figures should be added to the total exports. The figures for 1915 and 1916 are for Ceylon rubber only.

FEDERATED MALAY STATES RUBBER EXPORTS.

An official cablegram from the Federated Malay States during the month of October as 5,968 tons against 6,376 tons in the previous month and 4,120 tons in the corresponding month last year. This gives a total of 50,270 tons for ten months of the current year against 34,777 tons in 1915 and 24,447 tons in 1914. Appended are the comparative figures:

	1914.	1915.	1916.
January	3,473	4,471	
February	3,411	5,207	
March	3,418	4,429	
April	2,151	2,777	3,914
May	2,708	3,956	
June	3,403	5,114	
July	3,796	5,053	
August	3,984	5,782	
September	2,879	6,376	
October	4,120	5,968	
Totals	24,447	34,777	50,270

STRAITS SETTLEMENTS RUBBER EXPORTS.

An official cablegram from Singapore gives the figures of the export of plantation rubber from Straits Settlements ports during the month of September as 2,987 tons against 3,246 tons in August last and 4,725 tons in the corresponding month last year. This gives a total of 34,951 tons for nine months of the current year against 24,953 tons in 1915 and 13,017 tons in 1914. The following are the comparative figures:

	1914.	1915.	1916.
January	1,181	2,576	4,443
February	1,703	2,741	3,359
March	1,285	2,477	4,481
April	1,548	1,978	4,219
May	1,309	3,588	3,274
June	1,480	2,249	3,836
July	1,584	2,324	5,106
August	1,325	2,295	3,246
September	1,602	4,725	2,987
Totals	13,017	24,953	34,951

These figures include transshipments of rubber from various places in the neighborhood of the Straits Settlements such as Borneo, Java, Sumatra and the non-Federated Malay States as well as rubber actually exported from the Colony, but do not include rubber exports from the Federated Malay States.

IMPORTS AND EXPORTS OF RUBBER AND GUTTA AT SINGAPORE

IMPORTS.

September, 1916.

From—	Para Rubber	Para Rubber	Para Rubber	Gutta	Gutta
Malay Peninsula—	Para Rubber	To Treatment.	Borneo Rubber.	Gutta Percha.	Gutta Jelutong.
Port Swettenham, pounds	1,680,266				
Teluk Anson	1,063,866				
Penang	685,733	1,866			
Mua	669,936	4,533			
Malacca	411,566	734,133			
Port Dickson	130,133				
Kelantan	123,866	13,066			
Kuantan	39,200				
Remot	34,533				
S. Pandjang	3,200				
Mersing	533				
Tringganu	133				
Totals	4,842,965	780,931			

From—	Para Rubber	Para Rubber	Para Rubber	Gutta	Gutta
Sumatra—	Para Rubber	To Treatment.	Borneo Rubber.	Gutta Percha.	Gutta Jelutong.
Sarawak	128,533	24,933	2,000	1,866	554,600
Pontianak	100,466	6,133	6,933	5,066	5,600
Bandjermassin	59,200	32,800	3,600	6,000	16,133
Siam	40,666	12,800		666	27,533
Less In	33,200	252,000	266	5,466	70,333
Sandakan	30,266	44,400			
Siam	24,823		933	2,266	52,533
Piss	4,666				
Kedat	4,000			533	
Singakwang	2,000				
Samarinda	666		2,133	7,266	234,666
Totals	532,659	515,332			

Imports					EXPORTS.				
	Para-Rubber	Latex	Gutta	Gutta	To—	Latex	Gutta	Gutta	
					United States	Rubber	shipped	Percha.	Jelutong.
Sourabaya	197,066				Manila				
Batavia	124,666				Seattle	1,032,866	42,933	118,000	206,933
Totals	321,732				Totals	7,259,932	425,332		
Patani	666								
Totals	1,732								
Rangoon	15,063								
Malacca	3,600								
Totals	18,663								
Colombo	43,733								
Other ports	262,400	248,533	8,533	13,733					
Grand Totals	6,539,403	1,997,595	27,996	52,740					

EXPORTS OF INDIA RUBBER FROM MANAOS DURING SEPTEMBER, 1916.

NEW YORK.

EUROPE.

EXPORTERS.	Fine.	Medium.	Coarse.	Caucho.	TOTALS.	Fine.	Medium.	Coarse.	Caucho.	TOTALS.	GRAND TOTALS.
Suter & Co.	29,911	4,160	10,243	6	44,320	59,918	387	2,601	47,343	119,249	154,569
General Rubber Co. of Brazil	47,918	4,089	17,354	639	70,000	161,390	16,104	4,354	63,152	245,000	315,000
Tancredo Porto & Co.	101,326	14,972	17,903	1,903	136,104	68,545	16,992		12,054	98,000	234,104
Adelbert H. Alden, Ltd.	3,743	8,568	6,788	170	19,269	44,433	10		15,516	59,977	79,246
Armazens Andresen	34,091	945	5,243	7,560	47,839						47,839
I. G. Araujo	8,640	2,764	4,111		15,515	15,840				15,840	31,355
Ohliger & Co.	14,479	1,384	5,675	7,081	28,569						28,569
E. Strassberger & Co.	18,398		4,675	5,491	28,564						28,564
Amorim Irmaos						1,120		880		2,000	2,000
W. Peters & Co.	830		775	230	1,835						1,835
Theodore Levy, Camille & Co.							326	640	560	1,526	1,526
Mesquita & Co.											960
Vianna Hudrade & Co.				155	155						155
Totals, September, 1916	259,336	36,882	72,767	23,185	392,170	351,246		9,713	138,625	533,397	925,567
August, 1916	435,962	47,117	84,672	24,754	592,535	272,281		10,127	258,293	561,305	1,153,840
July, 1916	238,014	21,593	31,284	204,740	495,631	68,650		18,914	269,029	400,525	896,150
January to June, 1916	2,537,504	410,024	996,427	1,438,355	5,382,310	1,450,817		242,475	1,240,885	3,248,073	8,630,383

EXPORTS OF INDIA RUBBER FROM PARA AND MANAOS DURING SEPTEMBER, 1916.

NEW YORK.

EUROPE.

EXPORTERS.	Fine.	Medium.	Coarse.	Caucho.	TOTALS.	Fine.	Medium.	Coarse.	Caucho.	TOTALS.	GRAND TOTALS.
J. Marques	346,173	30,931	83,078	31,303	491,485	7,810		5,940	8,636	20,086	511,571
General Rubber Co. of Brazil	1,360	3,130	60,030	670	65,190	127,481	3,570		7,525	138,576	203,766
Suter & Co.	20,726	4,066	28,881	291	54,004	61,234	302	7,590	11,806	80,832	134,896
Pires Teixeira & Co.	22,100	2,678	47,861	5,280	77,919	28,345				28,345	106,264
Suter & Co.	41,569		2,189	3,856	47,614	16,438			7,938	24,376	71,990
Adelbert H. Alden, Ltd.	170	3,394	4,923		8,487	33,754			1,012	34,766	43,253
Sundries	19,137		9,240	8,969	37,346	8,814	1,148	505	17,764	28,231	65,517
Totals	451,235	44,199	236,202	50,309	781,945	281,576	5,020	14,035	54,681	355,312	1,137,257
Exports from Itacoatiara						6,840	480	4,050	170	11,540	11,540
Exports from Manaos	417,779	46,490	93,003	25,033	582,305	351,246	33,813	9,713	138,625	533,397	1,115,702
Totals	869,014	90,689	329,205	75,342	1,364,250	639,662	39,313	27,798	193,476	900,249	2,264,499

(Compiled by Suter & Co., Para.)

CRUDE RUBBER ARRIVALS AT THE PORT OF NEW YORK.

(The Figures Indicate Weights in Pounds.)

NOVEMBER 3.—By the steamer *Stephen* from Para and Manaos:

	Fine.	Medium.	Coarse.	Caucho.	TOTALS.
Meyer & Brown	98,400	25,100	66,500	14,300	204,300
Davies, Turner & Co.	795,700	29,500	130,000	128,000	1,083,200
Arnold & Zeiss	155,100	7,100	33,100	100	195,400
Henderson & Korn		25,400	56,800	86,000	168,200
H. A. Astlett & Co.	38,000	36,700	74,600	2,900	152,200
Aldens' Successors, Ltd.	17,000	14,000	30,500		61,500
Paul Bernbach	37,400		20,800		58,200
Hagemeyer & Brunn	32,500	2,100	19,800		54,400
General Rubber Co.			44,500		44,500
Robinson & Co.	29,900	1,600	11,700		43,200
Pell & Dumont			23,100		23,100
F. D. Duerr & Co.	3,100			11,700	14,800
Totals	1,207,100	141,500	511,400	243,000	2,103,000

NOVEMBER 10.—By the steamer *Sergipe* from Para:

	Fine.	Medium.	Coarse.	Caucho.	TOTALS.
Meyer & Brown	8,600	1,100	46,300		56,000
Davies, Turner & Co.	214,200	12,800	11,300	10,500	248,800
H. A. Astlett & Co.	2,500		61,600		64,100
Neuss, Hesslein & Co.	41,300		8,800		50,100
Hagemeyer & Brunn	29,900	8,000	7,200	700	45,800
G. Amsinck & Co.	11,300	1,300	4,200	28,400	45,200

Henderson & Korn	10,700	1,300	10,000	13,800	42,100
Muller, Schall & Co.	34,500	2,400	3,700	700	41,300
Aldens' Successors, Ltd.	400	1,200	3,100		32,600
Arnold & Zeiss			22,600		22,600
General Rubber Co.			22,500		22,500
Paul Bernbach	15,000	1,400			16,400
W. R. Grace & Co.			11,300		11,300
V. D. Duerr & Co.	2,400				7,600
Totals	372,100	29,300	239,700	65,300	706,400

NOVEMBER 13.—By the steamer *Araduaia* from Para and Manaos:

Meyer & Brown	46,800	4,700	1,000		63,100
Davies, Turner & Co.	292,800	6,000	1,700	4,800	324,300
Aldens' Successors, Ltd.	41,000	5,000	5,500		85,500
Henderson & Korn	15,000	1,800	46,000		63,000
Arnold & Zeiss	39,200	2,300	13,300		54,800
H. A. Astlett & Co.	1,800	4,100	30,300		39,400
W. R. Grace & Co.	7,800			10,000	38,400
Robinson & Co.		12,400	19,500		31,900
General Rubber Co.			22,500		22,500
Pell & Dumont			12,000		12,000
Totals	464,400	40,900	111,400	18,200	734,900

PARAS.

NOVEMBER 1.—By the <i>Cristobal</i> =Colon:	
G. Amsinck & Co. (Fine).....	7,000
G. Amsinck & Co. (Coarse).....	2,000
G. Amsinck & Co. (Cauchó).....	1,500
Mecke & Co. (Cauchó).....	20,000
30,500	
NOVEMBER 8.—By the <i>Carpathia</i> =Liverpool:	
Arnold & Zeiss (Coarse).....	45,000

CENTRAIS

[*This sign, in connection with imports of Centrals, denotes Guayule rubber.]

OCTOBER 20.—By the <i>Santa Marta</i> =Cartagena:	
G. Amsinck & Co.....	4,500
R. del Castillo & Co.....	1,000
H. Wolff & Co.....	1,000
6,500	

OCTOBER 24.—By the <i>Metapan</i> =Port Limon:	
Isaac Brandon & Bros.....	1,000
A. A. Linde & Co.....	1,000
2,000	

OCTOBER 25.—By the <i>Van Heerdt</i> =Guayaquil:	
Andean Trading Co.....	20,000

OCTOBER 26.—By the <i>Almarriz</i> =Cartagena:	
G. Amsinck & Co.....	3,000
American Trading Co.....	1,500
De Lima, Cortissoz & Co.....	5,000
Andean Trading Co.....	1,000
H. Wolff & Co.....	500
11,000	

NOVEMBER 1.—By the <i>Panama</i> =Colon:	
G. Amsinck & Co.....	5,100
A. M. Capen's Sons.....	8,700
Mecke & Co.....	3,600
Pablo Calvet & Co.....	2,000
19,400	

NOVEMBER 1.—By the <i>Cristobal</i> =Colon:	
G. Amsinck & Co.....	21,200
Pablo Calvet & Co.....	27,500
Lawrence Johnson & Co.....	19,800
Mecke & Co.....	3,000
W. R. Grace & Co.....	8,500
Pottberg, Ebeling & Co.....	1,500
Isaac Brandon & Bros.....	2,000
Dumarest Bros.....	3,600
J. S. Sembrada & Co.....	1,000
Alpers & Merritt.....	6,300
94,100	

NOVEMBER 6.—By the <i>Saramacca</i> =Barrios:	
A. Rosenthal & Sons.....	2,500
W. R. Grace & Co.....	1,200
G. Amsinck & Co.....	500
4,200	

NOVEMBER 8.—By the <i>Calamares</i> =Port Limon:	
Isaac Brandon & Bros.....	1,000

NOVEMBER 10.—By the <i>Carrillo</i> =Colombia:	
G. Amsinck & Co.....	2,000

NOVEMBER 13.—By the <i>Guantanamo</i> =Mexico:	
G. Amsinck & Co.....	3,500
American Trading Co.....	22,000
Henderson & Korn.....	2,500
H. Marquardt & Co.....	200
Various.....	4,000
32,200	

NOVEMBER 14.—By the <i>Tenadores</i> =Port Limon:	
Isaac Brandon & Bros.....	600
H. Marquardt & Co.....	200
Stark & Co.....	200
1,000	

NOVEMBER 14.—By the <i>Colon</i> =Colon:	
Piza, Nephews & Co.....	4,000
Fidanque Bros. & Co.....	1,000
5,000	

NOVEMBER 15.—By the <i>Esperanza</i> =Mexico:	
General Export & Commission Co.....	600
Graham, Hinklev & Co.....	600
C. Tennant, Sons & Co.....	*45,000
U. S. Brokerage.....	400
46,600	

AFRICANS.

OCTOBER 1.—By the <i>Prad</i> =Batavia:	
General Rubber Co.....	60,000
Karl Schroeder.....	20,000
80,000	

OCTOBER 23.—By the <i>Kroonland</i> =Liverpool:	
Goodyear Tire & Rubber Co....	16,000
Fred. Stern & Co.....	4,000
20,000	

OCTOBER 23.—By the <i>La Plata</i> =Liverpool:	
Meyer & Brown.....	5,000

OCTOBER 24.—By the <i>Gilbert</i> =Hull:	
Arnold & Zeiss.....	1,000
Fred. Stern & Co.....	8,000
20,000	

NOVEMBER 1.—By the <i>La Rance</i> =Bordeaux:	
Robert Badenhop Co., Inc.....	22,500

NOVEMBER 3.—By the <i>Roepat</i> =Batavia:	
General Rubber Co.....	320,000

NOVEMBER 3.—By the <i>Roepat</i> =Batavia:	
General Rubber Co.....	320,000
Rubber Trading Co.....	4,500

NOVEMBER 6.—By the <i>St. Louis</i> =Liverpool:	
Goodyear Tire & Rubber Co.....	22,500

NOVEMBER 6.—By the <i>Gogsa</i> =Lisbon:	
Various.....	60,000

NOVEMBER 8.—By the <i>Saxonia</i> =Liverpool:	
Fred. Stern & Co.....	11,000
Rubber Trading Co.....	22,400
33,400	

NOVEMBER 8.—By the <i>Carpathia</i> =Liverpool:	
Rubber Trading Co.....	22,000
J. T. Johnstone & Co.....	3,000
25,000	

NOVEMBER 16.—By the <i>Andania</i> =London:	
L. Littlejohn & Co.....	33,500

NOVEMBER 18.—By the <i>Cedric</i> =Liverpool:	
Robert Badenhop & Co., Inc.....	4,500

MANICOBAS.

OCTOBER 25.—By the <i>Cuthbert</i> =Pernambuco:	
G. Amsinck & Co.....	2,000

NOVEMBER 3.—By the <i>Eastern Prince</i> =Bahia:	
Charles T. Wilson Co., Inc.....	3,000

NOVEMBER 10.—By the <i>Sergipe</i> =Pernambuco:	
Lawrence Johnson & Co.....	20,000

NOVEMBER 11.—By the <i>Tocantins</i> =Bahia:	
Abelk Hirsch & Co.....	20,000

PLANTATIONS

OCTOBER 1.—By the <i>M...</i> =London:	
Rubber Trading Co.....	18,000
Fred. Stern & Co.....	130,000
Goodyear Tire & Rubber Co....	45,000
193,000	

OCTOBER 21.—By the <i>Veendyk</i> =Batavia:	
G. Amsinck & Co.....	170,000
General Rubber Co.....	340,000
Edward Maurer & Co., Inc....	270,000
Firestone Tire & Rubber Co....	60,000
Manhattan Rubber Manufactur-	
ing Co.....	65,000
W. R. Grace & Co.....	22,500
290,000	

OCTOBER 21.—By the <i>Veendyk</i> =Batavia:	
G. Amsinck & Co.....	170,000
General Rubber Co.....	340,000
Edward Maurer & Co., Inc....	270,000
Firestone Tire & Rubber Co....	60,000
Manhattan Rubber Manufactur-	
ing Co.....	65,000
W. R. Grace & Co.....	22,500
290,000	

OCTOBER 21.—By the <i>Veendyk</i> =Batavia:	
G. Amsinck & Co.....	170,000
General Rubber Co.....	340,000
Edward Maurer & Co., Inc....	270,000
Firestone Tire & Rubber Co....	60,000
Manhattan Rubber Manufactur-	
ing Co.....	65,000
W. R. Grace & Co.....	22,500
290,000	

OCTOBER 21.—By the <i>Veendyk</i> =Batavia:	
G. Amsinck & Co.....	170,000
General Rubber Co.....	340,000
Edward Maurer & Co., Inc....	270,000
Firestone Tire & Rubber Co....	60,000
Manhattan Rubber Manufactur-	
ing Co.....	65,000
W. R. Grace & Co.....	22,500
290,000	

OCTOBER 21.—By the <i>Veendyk</i> =Batavia:	
G. Amsinck & Co.....	170,000
General Rubber Co.....	340,000
Edward Maurer & Co., Inc....	270,000
Firestone Tire & Rubber Co....	60,000
Manhattan Rubber Manufactur-	
ing Co.....	65,000
W. R. Grace & Co.....	22,500
290,000	

OCTOBER 21.—By the <i>Veendyk</i> =Batavia:	
G. Amsinck & Co.....	170,000
General Rubber Co.....	340,000
Edward Maurer & Co., Inc....	270,000
Firestone Tire & Rubber Co....	60,000
Manhattan Rubber Manufactur-	
ing Co.....	65,000
W. R. Grace & Co.....	22,500
290,000	

OCTOBER 21.—By the <i>Veendyk</i> =Batavia:	
G. Amsinck & Co.....	170,000
General Rubber Co.....	340,000
Edward Maurer & Co., Inc....	270,000
Firestone Tire & Rubber Co....	60,000
Manhattan Rubber Manufactur-	
ing Co.....	65,000
W. R. Grace & Co.....	22,500
290,000	

OCTOBER 21.—By the <i>Veendyk</i> =Batavia:	
G. Amsinck & Co.....	170,000
General Rubber Co.....	340,000
Edward Maurer & Co., Inc....	270,000
Firestone Tire & Rubber Co....	60,000
Manhattan Rubber Manufactur-	
ing Co.....	65,000
W. R. Grace & Co.....	22,500
290,000	

OCTOBER 26.—By the *Mesaba*=London:

Meyer & Brown.....	170,000
L. Littlejohn & Co.....	10,080
Edward Maurer & Co., Inc....	30,000
Charles T. Wilson Co., Inc....	90,000
322,080	

OCTOBER 26.—By the *Mesaba*=London:

Rubber Trading Co.....	145,600
Fred. Stern & Co.....	80,000
Michelin Tire Co.....	45,000
L. Littlejohn & Co.....	116,756
Charles T. Wilson Co., Inc....	70,000
457,356	

OCTOBER 30.—By the *Headley*=London:

Arnold & Zeiss.....	240,000
Aldens' Successors, Ltd.....	273,000
L. Littlejohn & Co.....	225,582
R. F. Goodrich Co.....	33,000
Robinson & Co.....	60,000
I. T. Johnstone & Co.....	44,800
Raw Products Co.....	9,000
Henderson & Korn.....	7,000
Edward Maurer & Co., Inc....	4,500
W. R. Grace & Co.....	1,500
923,382	

NOVEMBER 3.—By the *Foye*=London:

Meyer & Brown.....	70,000
Arnold & Zeiss.....	115,000
General Rubber Co.....	80,000
The B. F. Goodrich Co.....	70,000
Michelin Tire Co.....	50,000
Robinson & Co.....	80,000
Hagemeyer Trading Co.....	4,500
Edward Maurer & Co., Inc....	33,000
Various.....	60,000
562,500	

NOVEMBER 3.—By the *Foye*=London:

Meyer & Brown.....	100,000
Arnold & Zeiss.....	60,000
General Rubber Co.....	50,000
Fast Asiatic Co.....	40,000
Manhattan Rubber Mfg. Co....	90,000
Edward Maurer & Co., Inc....	13,500
Goodyear Tire & Rubber Co....	260,000
Step Hirsch & Co.....	7,000
Fred. Stern & Co.....	7,000
W. R. Grace & Co.....	4,500
I. W. Phyfe & Co.....	22,500
Toosten & Tanssen.....	9,000
L. Littlejohn & Co.....	193,217
Charles T. Wilson Co., Inc....	11,200
Aldens' Successors, Ltd.....	9,000
Robinson & Co.....	22,500
Rubber Trading Co.....	4,500
G. Amsinck & Co.....	315,000
Henderson & Korn.....	90,000
I. T. Johnstone & Co.....	112,000
Various.....	400,000
1,863,917	

NOVEMBER 4.—By the *M...*=London:

Meyer & Brown.....	50,000
Goodyear Tire & Rubber Co....	17,000
Henderson & Korn.....	40,000
L. Littlejohn & Co.....	317,800
Arnold & Zeiss.....	7,000
I. T. Johnstone & Co.....	47,000
Edward Maurer & Co., Inc....	2,200
Various.....	1,100
537,100	

NOVEMBER 6.—By the *Baltic*=Liverpool:

Rubber Trading Co.....	1,000
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NOVEMBER 8.—By the *Baltic*=Liverpool:

The B. F. Goodrich Co.....	11,000
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NOVEMBER 10.—By the *Baltic*=Liverpool:

Meyer & Brown.....	70,000
Edward Maurer & Co., Inc....	135,000
L. Littlejohn & Co.....	354,252
Charles T. Wilson Co., Inc....	45,000
G. R. Henke.....	22,500
Rubber Trading Co.....	112,000
Fred. Stern & Co.....	20,000
738,752	

NOVEMBER 10.—By the *Baltic*=Liverpool:

Edward Maurer & Co., Inc....	180,000
W. H. Stiles & Co.....	13,500
Hagemeyer Trading Co.....	22,500
Aldens' Successors, Ltd.....	571,600
Michelin Tire Co.....	85,000
Charles T. Wilson Co., Inc....	50,000
L. Littlejohn & Co.....	38,000
1,443,600	

NOVEMBER 10.—By the *Baltic*=Liverpool:

Meyer & Brown.....	70,000
Goodyear Tire & Rubber Co....	95,000
Fred. Stern & Co.....	40,000
Rubber Trading Co.....	11,000
216,000	

CRUDE RUBBER ARRIVALS AT CUSTOM HOUSE STATISTICS.

SEATTLE.

PLANTATION
TO AKRON.

TO SAN FRANCISCO.

Mitsui & Co.
1,870W. R. Grace & Co.
R

TO AKRON.

Firestone Tire & Rubber Co.

Goodyear Tire & Rubber Co.
Wadleigh & Co. 122,070 351,390

TO AKRON.

Firestone Tire & Rubber Co.
The Waterhouse Co. 161,070Goodyear Tire & Rubber Co.
Wadleigh & Co. 161,300

Nippon Yusen Kaisha (Seattle) 38,220 303,680

TO AKRON.

Goodyear Tire & Rubber Co.
Harrisons & Crosfield. 253,630
Wadleigh & Co. 218,920
Anglo Malay Rubber Co. 33,540
Rubber Estates of Johore. 22,880
Duff Development Co. 15,340
Anglo Sumatra Rubber Co. 5,200 549,510

TO NEW YORK.

United States Rubber Co.
General Rubber Co. 65,000
Arnold & Zeiss.
Planters Stores & Agency Co. 9,100
Cicely Rubber Estate Co. 4,420
Gloucester Rubber Estates. 2,080East Asiatic Co.
Kualanal Kelanton Rubber Co. 4,290
Duff Development Co. 2,990
Kuala Pahi Rubber Estate. 2,730
L. Littlejohn & Co.
Kuala Pahi Rubber Estate. 2,730 98,280

TO SEATTLE.

Goodyear Tire & Rubber Co.
C. W. Mackie & Co. 65,000
Sandilands Buttery & Co. 34,450
Planters Stores & Agency Co. 3,380
W. R. Grace & Co.
Tea Estates Co. 12,480
Carson & Co. 11,180The Rose Laugh Tea & Rubber Co. 8,710
The Ulu Rantan Rubber Estate. 4,550
Sandilands Buttery & Co. 4,160
Glensheil Rubber Estate Co. 2,470
Cheras Rubber Co. 2,470
Sungei Purun Rubber Co. 2,470
R. T. Reid & Co. 1,950
Tangga Batu Rubber Co. 1,950 159,770

CUSTOM HOUSE STATISTICS.

Imports
Gutta jelutong (Pontianak) 28,390
Manuf. of india rubber 301Exports
India rubber shoes. 5,958
Belting, hose, etc. 19,078
All other manufactures of india rubber 236

Total 239,005

Imports
India rubber shoes. 5,958
Belting, hose, etc. 19,078
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CUSTOM HOUSE STATISTICS.

Imports
India rubber shoes. 5,415 3,718
Other tires 265
Belting, hose, etc. 2,735Exports
India rubber shoes. 5,415 3,718
Other tires 265
Belting, hose, etc. 2,735

Total 5,143

Imports
India rubber shoes. 5,415 3,718
Other tires 265
Belting, hose, etc. 2,735

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India rubber shoes. 5,415 3,718
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Total 5,143

RUBBER STATISTICS FOR FRANCE.

IMPORTS.

Eight months ending August, 1916.
Unmanufactured—
Crude rubber:

From United States. 67,540

Brazil 162,360

French Congo. 27,940

Senegal 404,140

Other French West African colonies. 2,054,140

Other countries. 1,612,380

Total 7,383,860

From United States. 618,640

England 4,869,480

Brazil 82,500

British India. 10,560

French Congo. 244,860

Other French West African colonies. 31,680

Other countries. 471,680

Total 6,329,400

Marseilles—

From England. 118,140

British India. 2,458,060

Senegal 4,200

Other French West African colonies. 56,760

Other countries. 997,920

Total 3,633,080

From United States. 43,120

England 2,672,780

Other countries. 10,340

Total 2,726,240

Boulogne—

From England. 1,116,940

Other countries. 220

Total 1,117,160

Dunkirk—

From England. 1,281,060

Other countries. 440

Total 1,281,500

Other ports 4,400,000

Grand Total 26,871,240

EXPORTS.

UNMANUFACTURED

Crude rubber:

From Bordeaux. 409,400

Havre 279,840

Paris 28,380

Rouen 90,000

Dunkerque 105,160

Marseilles 12,100

Chambéry 1,800,700

Toulouse 228,140

Boulogne 3,300

Bellegarde 10,340

Nîmes 42,020

Relfort 27,000

Other Ports 999,680

Total 3,976,720

IMPORTS AND EXPORTS OF CRUDE AND MANUFACTURED RUBBER AT THE PORT OF NEW YORK.

Week Ending	India Rubber.		Scrap for Re-manufacture.		Latex.		Gutta Percha.		Gutta Jelutong.	
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
October 20, 1916.....	2,292,762	\$7,817*	1,111	\$7,536	68,613	\$31,089	112,797	\$20,627†	11,317	\$2,138
October 27, 1916.....	3,535,593	2,021,996	105,679	15,253	88,536	41,183		685†		181
November 3, 1916.....	2,400,729	1,344,150	239,044	16,589	36,901	14,965		10		
November 10, 1916.....	5,891,267	2,663,656	10,048	14,744	189,462	118,578	2,644	272		
November 17, 1916.....	3,885,625	1,981,389	185,077	9,937	24,011	9,571	2,644	272	79,462	2,575

In addition to the above, 723 pounds of latex was imported from Mexico, valued at \$164.

* Manufactures of India Rubber. † Manufactures of Gutta Percha.

EXPORTED TO	EXPORTS.									
	FIGURES ISSUED FROM OCTOBER 25 TO NOVEMBER 24, 1916.									
	Hose and Packing.	Boots.	Shoes.	Auto.	Other.	Wire and Cables.	Other kinds of India Rubber.	Fountain Pens.	Chewing Gum.	Reclaimed Rubber.
NORTH AMERICA.										
Bermuda.....	\$135		\$414		\$174	\$149	\$638	82	\$185	
British Honduras.....	44				4		7			
Canada.....						100				
Central American States.....										
Costa Rica.....	853			\$2,740	55	1,077	681		142	
Guatemala.....	1,177			635	86	582	661		786	
Honduras.....	81			1,708	165	187	247		12	
Nicaragua.....	307						792		48	
Panama.....	3,908	\$86	5,586	7,349	2,083	17,174	2,159	393	4,059	
Salvador.....	1,640			784	40	381	1,180		305	
Mexico.....	9,325		690	9,640	16,167	14,026	4,243	1,033	210	
Newfoundland.....	441	1,505	14,613	930		2,463	3,300	3	676	
West Indies.....										
British—										
Barbados.....			26	959			72			
Jamaica.....	797		259	5,401	216	682	1,040	4	59	
Trinidad and Tobago.....	346		1,185	4,058	93	572	1,240		43	
Other British.....	34		993	3,977	494		257		6	
Cuba.....	26,315		3,808	51,051	9,950	48,272	31,360	776	1,958	
Danish.....	74			170	78	5	114			
Dutch.....	2		13	460	28	1	206			
French.....	2		382	776	408		462	107		
Haiti.....	242		33	241	82	104	712	8		
Santo Domingo.....	818		201	3,161	492	645	1,433	12	276	
Totals, North America.....	\$45,891	\$2,391	\$28,203	\$93,940	\$30,615	\$87,225	\$52,671	\$2,340	\$8,770	
EUROPE.										
Azores Islands.....							\$6			
Denmark.....	\$2,976		\$6,563	\$915	\$390		25			
France.....	1,333	\$15,850		40,049	609	\$200,820	60,672		\$42,209	\$3,619
Greece.....						260	340			
Iceland.....	109	71				250	300			
Italy.....	111	3	4,260	3,201	5,821	574	9,726	\$1,057		
Netherlands.....	1,386					9,001	6,131			
Norway.....	5,927		662	3,947		21,731	1,577	100	291	
Portugal.....				3,673				354		
Russia in Europe.....						2,537	79			
Spain.....				15,601		1,704	2,982	1,869		
Sweden.....					520		4,377			
Switzerland.....			15			271	7,877			
United Kingdom.....										
England.....	29,747	56,425	56,291	253,871	52,200	128,670	22,007	1,674	132,041	4,598
Scotland.....	19,701		77			77	1,474		8,519	
Totals, Europe.....	\$61,290	\$72,349	\$68,312	\$81,157	\$86,740	\$366,815	\$318,633	\$5,054	\$18,090	\$8,217
SOUTH AMERICA.										
Argentina.....	\$12,232	\$11	\$442	\$115,532	\$31,018	\$20,235	\$9,115	\$8	\$2,076	
Bolivia.....	669			2,082	951		340			
Brazil.....	7,570	25	1,857	30,407	1,698	43,894	15,548		58	
Chile.....	5,255	354	334	17,450	2,371	9,908	7,777	16	88	
Colombia.....	47		186	1,586	1,375	2,213	4,938			
Ecuador.....	772			3,766	419	45	2,294		250	
Guinea British.....	533		203	587			367			
Dutch.....	7			154	56		221			
French.....							6			
Peru.....	3,335	656				10,322	3,282		87	
Uruguay.....	736		1	11,561	2,858	15,784	3,103		160	
Venezuela.....	3,017		107	13,117	1,430	1,451	4,055	18		
Totals, S. A. America.....	\$34,553	\$1,046	\$2,860	\$197,307	\$42,509	\$103,782	\$69,833	\$66	\$3,640	
ASIA.										
Aden.....										
China.....	\$1,081						\$977		\$126	
British India.....	1,998		\$9			1,904	7,008	\$160	\$130	
Dutch East Indies.....	268									
Japan.....	1,664		385			2,140				
Korea.....							375		27	
Russia in Asia.....	341						202			
Totals, Asia.....	\$4,354		\$394				\$11,234	\$160	\$1,198	\$1,407
OCEANIA.										
British—										
Australia and Tasmania.....			\$5,550			\$13,345	\$8,353		\$1,766	
British Oceania.....										
New Zealand.....				4,018	1,204	162	1,020		1,750	
Philippine Islands.....						317				
Totals, Oceania.....			\$5,550	\$32,093	\$7,118				\$3,516	
AFRICA.										
British Africa.....						\$1,054			\$890	
West.....										
South.....				\$1,289			11,235			
East.....										
Egypt.....										
Portuguese Africa.....							56			
Totals, Africa.....	\$41,000			\$35,225	\$3,727	\$12,289		\$28	\$4,274	

RUBBER STATISTICS FOR THE UNITED STATES.

IMPORTS OF CRUDE AND MANUFACTURED RUBBER.

	August, 1916.		Eight Months Ending August, 1916.	
	Pounds.	Value.	Pounds.	Value.
UNMANUFACTURED—free:				
India rubber:				
From Portugal			352,811	\$236,921
United Kingdom	3,258,597	\$7,200	1,200,590	540,655
Central America and Caribbean Islands			42,069,798	30,639,519
Brazil	45,847	18,966	892,375	416,510
Mexico	54,020	22,256	2,127,792	873,708
Peru	1,395,608	604,256	34,614,186	17,444,491
Other South America	843,450	386,894	4,359,928	2,133,635
Other India	12,235,565	7,353,320	97,770,251	62,214,126
Other	8,401	4,466	527,284	404,383
Totals	17,861,488	\$10,051,305	183,915,015	\$114,903,948
Balata	204,256	103,164	1,603,893	664,905
Guayule gum	274,645	74,520	1,673,125	479,475
*Gutta jelutong			14,724,397	759,205
†Gutta jelutong	4,254,623	171,830	5,646,732	250,523
Gutta percha	632,079	72,243	2,774,645	299,999
Totals	23,227,091	\$11,473,062	210,287,837	\$117,358,055
Rubber scrap	1,279,622	99,749	10,563,404	852,033
Totals, unmanufactured	24,506,713	\$11,572,811	220,851,241	\$118,210,088
Chicle	599,488	\$256,751	4,937,590	\$2,088,995
MANUFACTURED—free:				
Gutta percha				\$122,449
India rubber				31,980
Totals, manufactured		\$57,758		\$128,143
Subtotal		\$4,798		\$15,880

EXPORTS OF DOMESTIC MERCHANDISE.

	August, 1916.		Eight Months Ending August, 1916.	
	Pounds.	Value.	Pounds.	Value.
MANUFACTURED:				
Automobile tires:				
To Russia in Europe		\$14,668		\$883,167
England		137,983		4,711,563
Canada		74,906		675,391
Mexico		11,879		164,252
Cuba		8,574		483,127
Australia		136,054		1,430,063
New Zealand		86,636		865,876
Philippine Islands		66,365		346,242
Other countries		314,553		2,213,197
Totals		\$924,918		\$11,772,908
All other tires		280,177		920,868
Belting, hose and packing		421,383		501,623
Rubber boots	21,029	44,303	326,273	733,895
Rubber shoes	325,461	141,857	1,630,295	789,859
Scrap and old rubber		14,564	2,432,230	260,286
Reclaimed rubber	344,179	52,868	4,088,036	5,757,731
Other rubber manufactures		917,033		1,010,980
Totals, manufactured		\$2,797,103		\$24,681,961
Fountain pens	20,667	\$11,434	168,198	\$94,353

EXPORTS OF FOREIGN MERCHANDISE.

	August, 1916.		Eight Months Ending August, 1916.	
	Pounds.	Value.	Pounds.	Value.
UNMANUFACTURED:				
Balata	129,823	\$58,985	624,168	\$235,618
Guayule gum			56,000	2,520
Gutta percha			2,383	2,095
India rubber	320,224	167,087	4,109,545	2,563,679
Rubber scrap and refuse				
Totals	450,047	\$226,072	4,792,096	\$2,803,912
Chicle	8,406	\$2,388	85,972	\$29,346
MANUFACTURED:				
Gutta percha				
India rubber				31,616
Totals, manufactured				

EXPORTS OF RUBBER GOODS TO NON-CONTIGUOUS TERRITORIES OF THE UNITED STATES.

	August, 1916.		Eight Months Ending August, 1916.	
	Pounds.	Value.	Pounds.	Value.
MANUFACTURED:				
To Alaska:				
Belting, hose and packing		\$22,460		\$93,101
Boots and shoes		44,457	62,538	168,109
Other rubber goods		7,679		33,016
Totals		\$74,596		\$294,316
To Hawaii:				
Belting, hose and packing		\$4,754		\$53,254
Automobile tires		56,495		374,604
Other		2,110		66,893
Other rubber goods		13,759		67,717
Totals		\$82,130		\$562,468

To Philippine Islands:

Belting, hose and packing		\$3,451		\$42,829
Boots and shoes	32,687	23,951	57,623	39,714
Tires		88,965		375,731
Other rubber goods		4,573		184,318
Totals		\$120,940		\$642,592

To Porto Rico:

Belting, hose and packing		\$4,330		\$26,746
Automobile tires		54,707		326,827
Other tires		44		19,811
Other rubber goods		9,076		61,516
Totals		\$68,957		\$434,900

QUARTER ENDING JUNE 30, 1916.

IMPORTS OF CRUDE AND MANUFACTURED RUBBER.

	April 1, to June 30, 1916.			
	Pounds.	Value.	Pounds.	Value.
UNMANUFACTURED—free:				
Balata, crude	497,334	\$206,824		
Guayule gum	814,360	231,978		
*Gutta jelutong	10,566,744	544,089		
Gutta percha, crude	947,600	126,312		
India rubber, crude	80,966,921	52,282,685		
Scrap rubber	2,923,654	191,713		
Reclaimed rubber	535,799	87,111		
Totals, unmanufactured	97,252,412	\$53,670,712		
MANUFACTURED—free:				
Gutta percha	10 per cent.	\$52,047		
India rubber	15 per cent.	116,379		
Druggists' sundries of rubber	15 per cent.	8,598		
Hard rubber	25 per cent.	5,990		
Substitutes, elasticon, etc.	15 per cent.	1,770		
Totals, manufactured		\$184,784		
Chicle: Crude	15 cents per lb.	778,125		\$234,149
Refined	20 cents per lb.	739,526		416,737
Totals		1,517,651		\$835,670

*Free, January to June, 1916 (inclusive).

†Dutiable beginning July 1, 1916.

Not separately stated prior to January 1, 1916.

UNITED KINGDOM RUBBER STATISTICS.

	September, 1916.		Nine Months Ending September, 1916.	
	Pounds.	Value.	Pounds.	Value.
UNMANUFACTURED:				
Crude rubber:				
From Dutch East Indies	787,800	\$522,100	7,846,300	\$5,396,873
French West Africa	22,700	10,224	1,260,700	653,629
Gold Coast	78,460	19,949	*1,261,100	502,529
Other countries				
Africa	48,459	216,189	6,369,400	3,224,366
Peru			1,197,400	768,883
Brazil	1,568,460	854,157	17,906,600	11,636,454
British India	392,200	226,547	2,816,900	2,010,828
States Settlements and dependencies, including India	3,776,600	1,818,182	35,797,500	24,819,641
East Africa				
Ceylon and depend-	6,449,500	4,030,540	30,294,000	20,584,924
Other countries				
Totals	16,606,200	\$9,555,201	123,807,000	\$82,665,140
Waste and reclaimed rubber	150,100	\$16,065	4,334,000	\$548,551
Totals		133,675	5,108,000	2,317,196
MANUFACTURED:				
Automobile tires		\$962		\$51,582
Boots and shoes	23,143	125,892	169,345	1,363,780
Belting, hose and packing		42,278		444,741
Submarine cables				30,292
Automobile tires and tubes		451,467		9,223,850
Motorcycle tires and tubes		39,394		372,989
Cycle tires and tubes		56,768		427,043
Other		1,485		37,190

EXPORTS.

	September, 1916.		Nine Months Ending September, 1916.	
	Pounds.	Value.	Pounds.	Value.
MANUFACTURED:				
Automobile tires		\$27,213		\$298,447
British South Africa		18,850		146,515
British East Indies		7,664		115,855
Australia		38,146		249,246
New Zealand		19,111		147,318
Canada		56,849		292,156
Other countries		133,371		1,022,257
Totals		\$301,204		\$2,271,794
Boots and shoes	8,727	\$57,496	80,331	\$415,192
Insulated wire		412,321		2,056,571
Submarine cables		52,603		1,845,874
Automobile tires and tubes		517,360		4,483,115
Motorcycle tires and tubes		44,839		347,526
Cycle tires and tubes		200,377		2,471,180
Tires, not specified		111,670		873,753
Manufactures not specified		759,496		6,049,841

EXPORTS—FOREIGN AND COLONIAL.

UNMANUFACTURED	September, 1916.		Nine Months Ending September, 1916.	
	Pounds.	Value.	Pounds.	Value.
Crude rubber:				
To Russia.....	970,100	\$605,377	9,562,500	\$6,698,019
France.....	2,054,100	1,190,309	16,095,000	11,109,992
United States.....	2,718,600	1,512,528	42,783,700	30,939,134
Other countries.....	834,900	511,395	12,891,100	8,925,945
Totals.....	6,577,000	\$3,819,609	81,332,300	\$57,673,090
Waste and reclaimed rubber.....	4,200	\$505	443,400	\$76,334
Gutta percha.....	120,100	82,052	458,400	275,017
MANUFACTURED				
Apparel, waterproofed.....		\$371		\$2,617
Boots and shoes, dressed.....	2,000	23,719	23,535	135,478
Insulated wire.....		84,778		84,778
Automobile tires and tubes.....		374,503		3,237,399
Motorcycle tires and tubes.....		5,731		64,218
Cycle tires and tubes.....		114		111,075
Tires not specified.....		1,823		7,539

BRITISH CRUDE RUBBER STATISTICS.

IMPORTS.

UNMANUFACTURED	1913	1914	1915
Crude rubber:			
From Russia.....	7,643,700	3,234,400	
Germany.....	7,423,900	3,653,800	
German West Africa.....	421,600	142,400	138,500
German East Africa.....	550,000	205,600	2,700
Netherlands.....	1,073,200	472,500	2,800
Dutch East Indies.....	3,258,000	6,435,300	6,411,900
French Congo.....			
Belgium.....	1,486,500	1,926,700	
Belgian Congo.....	15,400	668,200	4,979,300
France.....	6,916,800	3,500,800	176,000
French West Africa.....	2,261,000	629,000	1,623,400
French Somaliland.....	61,400	2,100	31,500
Madagascar.....	107,100	44,600	45,000
Portugal.....	30,100	193,600	805,500
Portuguese West Africa.....	110,000	168,200	196,800
Portuguese East Africa.....	236,000	57,200	133,300
Liberia.....	58,900	12,800	8,500
United States.....	4,191,300	3,024,800	598,100
Mexico.....	149,800	74,300	13,700
Colombia.....	84,700	6,900	4,200
Venezuela.....	95,400	3,100	4,400
Ecuador.....	11,400	2,700	700
Peru.....	2,913,300	1,552,300	1,658,200
Chile.....	1,800	7,300	
Brazil.....	36,337,500	27,743,300	28,639,100
Uruguay.....	890,800	828,600	119,900
Bolivia.....	54,000	139,300	717,300
Argentina.....	974,000	855,900	130,000
Other foreign countries.....	985,400	499,600	283,900
Totals from foreign countries.....	79,764,900	56,526,000	67,470,000
British West Africa:			
Gambia.....	15,300	3,400	1,000
Sierra Leone.....	16,600	13,800	1,100
Gold Coast.....	1,493,500	564,400	631,000
Natal.....	264,700	53,400	2,300
British East Africa:			
Zanzibar and Pemba.....	38,400	21,500	13,500
East Africa Protectorate.....	195,000	101,400	133,100
British India.....	1,965,500	2,596,500	3,288,800
Straits Settlements.....			
Dependencies including Labuan.....	33,831,300	47,359,900	66,053,200
Federated Malay States.....	22,130,400	21,999,100	28,880,300
British Borneo.....	392,400	625,400	1,041,100
Other British possessions.....	1,441,900	738,400	207,200
Totals from British possessions.....	77,007,600	95,432,700	129,320,900
Grand Totals.....	157,443,900	151,919,600	176,045,600

RE-EXPORTS.

Crude rubber:			
To Russia.....	14,232,600	16,815,600	
Germany.....	2,700,000	841,600	
Denmark.....	345,800	205,100	
Germany.....	21,794,400	15,836,000	
Netherlands.....	2,750,800	1,907,100	
Belgium.....	5,082,000	3,315,400	
France.....	11,000,000	11,057,300	
Spain.....	146,800	271,900	
Austria-Hungary.....	313,400	1,521,500	
Italy.....	4,000	334,200	
United States.....	39,851,000	54,161,500	
Other foreign countries.....	70,900	100,800	
Totals to foreign countries.....	98,617,200	106,655,900	136,493,700
Australia:			
Other colonies.....	1,170,300	1,018,000	805,500
Canada.....	53,200	25,700	28,900
Other British possessions.....	985,700	2,221,100	4,949,100
Total British possessions.....	500	2,400	8,200
Total British possessions.....	2,209,700	3,267,200	5,791,700
Grand Totals.....	100,826,900	109,923,100	142,285,400

RUBBER STATISTICS FOR CANADA.

IMPORTS OF CRUDE AND MANUFACTURED RUBBER.

UNMANUFACTURED	August, 1916.		Five Months Ending August, 1916.	
	Pounds.	Value.	Pounds.	Value.
Rubber and gutta percha, crude caoutchouc or india rubber:				
From Great Britain.....	277,000	\$236,191	1,724,319	\$1,264,398
United States.....	295,782	158,898	1,603,633	951,939
Straits Settlements.....			33,849	21,607
Other countries.....			2,217	1,891
Totals.....	572,782	\$395,089	3,364,018	\$2,239,835
Rubber, re-covered:				
From Great Britain.....	33,918	\$1,231	64,137	\$6,354
United States.....	333,388	50,694	1,845,866	262,500
Totals.....	367,306	\$51,925	1,910,003	\$268,854
Hard rubber, in sheets and rods:				
From United States.....	6,893	\$4,354	14,294	\$10,301
Rubber substitute:				
From United States.....	30,997	\$2,739	251,255	\$21,475
Rubber, powdered, and rubber or gutta percha waste:				
From Great Britain.....			81,052	\$5,274
United States.....	38,152	\$2,353	459,492	33,812
Other countries.....	1,607	146	5,882	334
Totals.....	39,759	\$2,499	546,426	\$39,420
Rubber thread, not covered:				
From United States.....	1,984	\$2,996	17,329	\$26,578
Balata, crude:				
From United States.....			4,774	\$3,463
Chicle, crude:				
From United States.....	8,880	\$2,656	174,569	\$65,532
British Honduras.....	164,994	62,851	1,097,967	407,147
Mexico.....	137,933	58,268	334,727	156,345
Totals.....	311,807	\$123,775	1,607,263	\$629,024
MANUFACTURED				
Boots and shoes:				
From Great Britain.....		\$2,544		\$3,480
United States.....			441,719	
Totals.....	\$10,292	\$2,544	441,719	\$3,480
Belting:				
From Great Britain.....				\$247
United States.....	\$8,134		23,673	
Totals.....	\$8,134		23,673	\$247
Waterproof clothing:				
From Great Britain.....	\$400	\$78,938	384	\$201,551
United States.....	25,903		139,919	
Other countries.....	12		12	
Totals.....	\$26,315	\$78,938	140,478	\$201,551
Hose, lined with rubber:				
From Great Britain.....		\$333		\$488
United States.....	\$8,134		442,519	
Totals.....	\$8,134	\$333	442,519	\$488
Mats and matting:				
From Great Britain.....				\$66
United States.....	\$120		1,750	
Totals.....	\$120		1,750	\$66
Packing:				
From Great Britain.....	\$491			\$405
United States.....	6,699			
Other countries.....				
Totals.....	\$7,190		\$37,035	\$405
Rubber cement, and all other manufactures of india rubber and gutta percha, N. O. P.:				
From Great Britain.....	\$174	\$14,803	\$1,159	
United States.....	69,236		340,351	
Other countries.....	233		639	
Totals.....	\$89,643	\$14,803	\$342,149	\$104,049
Hard rubber in table:				
From United States.....	\$274		\$1,930	

Value of exports of rubber goods:

Five months ending August, 1916	\$5,222		
United States	104,454		
Other countries	90		
Total	\$5,222	\$104,544	\$5,222

The value of exports of rubber and all manufactures of rubber and gutta percha, not otherwise provided for, amounted to \$9 from Great Britain and \$1,428 from various countries for August; and \$96 from Great Britain and \$4,138 from various countries for the five months ending August, 1916, the values being at treaty rates.

EXPORTS OF DOMESTIC AND FOREIGN RUBBER GOODS.

	August, 1916.		Five Months Ending August, 1916.	
	Prod- ucts of Canada.	Reexports of foreign goods.	Prod- ucts of Canada.	Reexports of foreign goods.
MANUFACTURED	Value.	Value.	Value.	Value.
Belting:				
To Newfoundland			\$1,734	
Hose:				
To Great Britain	\$1,170		\$113,826	
United States		\$189	1,335	\$314
Newfoundland	603		2,116	
Other countries	944		4,695	
Totals	\$2,717	\$189	\$121,972	\$314
Boots and shoes:				
To Great Britain	\$62,914		\$230,108	
United States		\$36	87	\$288
Newfoundland	7,014		10,290	
Australia	4,456		11,165	
New Zealand	1,375		5,734	
Other countries	2,022		5,651	
Totals	\$77,781	\$36	\$263,035	\$288
Clothing:				
To United States				\$57
Newfoundland				\$578
Totals				\$635
Tires:				
To Great Britain	\$16,648	\$354	\$151,119	\$354
United States	4,345	606	49,886	31,104
Newfoundland	1,704		4,676	
Other countries	\$4,627		\$8,543	
Totals	\$27,324	\$960	\$294,218	\$31,458
*Rubber waste:				
To Great Britain			\$14,078	
United States	\$1,664		75,113	
Totals	\$12,634		\$89,191	
All other manufactures N. O. P.				
To Great Britain	\$7,265		\$37,040	
United States	945	\$1,586	1,726	\$5,124
Newfoundland	454		1,604	
New Zealand	108		451	
Other countries			1,726	\$42
Totals	\$9,111	\$1,586	\$39,447	\$5,666
Grand Total				
To United States	\$188,693	\$1,397	\$730,156	\$1,397
Other countries			1,704	
Totals	\$188,693	\$1,397	\$731,860	\$1,397

*During August 195,800 pounds of rubber waste was exported to the United States; and a total of 117,000 pounds to Great Britain and 1,110,800 pounds to the United States for the five months ending August, 1916.

†During August 316,804 pounds of gum chicle was exported to the United States; making a total of 2,250 pounds to various countries and 1,282,383 pounds to the United States for the five months ending August, 1916.

RUBBER STATISTICS FOR ITALY.

IMPORTS OF CRUDE AND MANUFACTURED RUBBER.

	Seven Months Ending July, 1915.		Seven Months Ending July, 1916.	
	Pounds.	Value.	Pounds.	Value.
UNMANUFACTURED				
India rubber and gutta percha—raw and reclaimed:				
From Great Britain			1,832,380	
Straits Settlements	1,942,600		1,084,380	
African Fr. Colony	32,120		6,380	
Belgian Congo			201,740	
Brazil	4,603,280		3,265,460	
Other countries	464,800		762,300	
Totals	7,045,800	\$4,942,807	7,152,640	\$5,019,853
Rubber scrap	81,340	\$63,348	4,486,900	\$354,261
MANUFACTURED				
India rubber and gutta percha—threads:				
From United States	20,680		31,900	
Great Britain	20,020		20,240	
Other countries	2,200		11,000	
Totals	42,900	\$94,570	63,140	\$110,782
India rubber and gutta percha—sheets:				
Cut sheets	1,760	\$2,625	2,420	\$3,609
Elastic fabric	3,300	1,303	220	87
Insulated wire	440	116	440	116
Hard rubber	7,700	5,404	27,060	18,991
India rubber and gutta percha—tubes:				
Cut sheets	880	\$1,390	1,100	\$1,737
Elastic fabric:				
From Austria-Hungary	880			
Germany	5,720			
Other countries	32,170		4,840	
Totals	38,720	\$20,381	4,840	\$2,548
Other forms	2,420	\$1,486	3,080	\$1,891
Belting	41,140	\$25,264	78,100	\$47,961
Rubber coated fabrics, pieces	56,980	\$69,982	82,500	\$101,325
Other forms:				
From Austria-Hungary	660			
Great Britain	22,220		27,060	
Other countries	660		440	
Totals	23,540	\$20,651	27,500	\$24,125
Boots and shoes—pairs				
From United States	8,419		15,078	
Austria-Hungary	1,531			
France	88		10,282	
Germany	4,224			
Other countries	149		140	
Totals	14,411	\$13,907	25,500	\$24,608
Elastic webbing:				
From Austria-Hungary	1,500			
France	1,700		14,520	
Germany	27,060		880	
Other countries	13,640		17,600	
Totals	58,300	\$76,718	33,000	\$43,425
Elastic fabric not specified:				
From Austria-Hungary	9,460			
France	7,480		214,720	
Germany				
Great Britain	102,300		85,580	
Other countries	4,180		6,600	
Totals	113,420	\$109,431	306,900	\$242,312
Tires:				
From United States			491,040	
Germany	2,640			
Great Britain	153,780		323,840	
Other countries			24,860	
Totals	156,420	\$141,608	839,740	\$1,473,362
Other rubber manufactures:				
From United States			867,380	
Austria-Hungary	13,640			
France	591,140		846,120	
Germany	63,140			
Great Britain	421,300		56,600	
Other countries	2,640		880	
Totals	1,354,100	\$950,332	2,251,040	\$1,579,049
Total Imports		\$7,049,353		\$9,050,042

EXPORTS OF CRUDE AND MANUFACTURED RUBBER.

	Seven Months Ending July, 1915.		Seven Months Ending July, 1916.	
	Pounds.	Value.	Pounds.	Value.
UNMANUFACTURED				
India rubber and gutta percha —raw and reclaimed.....	257,180	\$90,247	662,860	\$232,604
MANUFACTURED				
India rubber and gutta percha —in sheets:				
To Germany	5,700	..		
Great Britain .....	..	..	5,280	..
Argentina	1,800	..	3,740	..
Other countries	31,200	..	4,800	..
Totals	38,700	\$1,400	13,820	\$59,444
India rubber and gutta percha —tubes:				
Cut sheets .....	..	\$13,780	3,520	\$5,250
Elastic fabric	1,540	608	1,980	782
Insulated wire	1,100	290	660	174
Hard rubber	20,240	14,205	43,780	30,736
India rubber and gutta percha —tires:				
Cut sheets	2,640	\$4,169	9,000	\$14,243
Elastic fabric	52,800	27,792	67,540	35,551
Other tires	45,980	28,236	91,080	55,931
Belting	2,420	1,486	1,540	946
Boots and shoes	50	48	..	..
Elastic webbing:				
To France	1,980	..	5,280	..
Greece	37,840	..	60,280	..
Egypt	3,300	..	16,500	..
Argentina	35,420	..	77,660	..
Brazil	40,040	..	69,520	..
Cuba	22,440	..	22,220	..
Other countries	44,000	..	121,660	..
Totals	185,020	\$243,470	373,120	\$490,992
Elastic fabric—not specified:				
To Spain	660	..	440	..
Argentina	2,640	..	15,840	..
Brazil .....	..	..	220	..
Uruguay	1,100	..	1,760	..
Other countries	2,640	..	9,900	..
Totals	7,040	\$12,262	28,160	\$49,408
Tires:				
To France	109,780	..	124,960	..
Great Britain	366,960	..	2,895,420	..
Switzerland	215,160	..	66,220	..
India and Ceylon	243,100	..	324,720	..
Australia	16,940	..	57,860	..
Argentina	479,160	..	770,220	..
Brazil	220,440	..	452,760	..
Other countries	2,307,140	..	376,200	..
Totals	3,958,680	\$6,945,684	5,068,360	\$8,892,668
Other rubber manufactures:				
To Great Britain	21,120	..	39,380	..
Switzerland	77,440	..	26,400	..
Argentina	55,660	..	61,600	..
Other countries	192,940	..	143,220	..
Totals	347,160	\$243,643	270,600	\$189,912
Total Exports		\$7,695,400		\$10,058,641

THE MARKET FOR RUBBER SCRAP.

Copyright 1916.

NEW YORK.

RUBBER scrap has been firm during the past month, with the principal interest centered in boots and shoes. The upward tendency of crude rubber has had a strengthening effect on the rubber scrap market, and, with few exceptions, boots and shoes are the only commodities that have advanced materially. These show a gain of $\frac{3}{8}$ to $\frac{1}{4}$ cent over the delivered price quoted a month ago.

The mills are reported to have bought quite heavily in some localities, but the volume of business transacted has not been sufficient to advance prices generally. Supplies are reported to be below the average, and, moreover, it is generally expected that at this time of the year collections will diminish. From the number of inquiries it is believed that the mills are considering replenishing their stocks, which are supposed to be low. Now that rubber mills are in the market for crude rubber there is reason to believe that reclaimers will soon follow, for reclaimed rubber is the principal filler used in rubber manufacture.

BOOTS AND SHOES. That the reclaimers have paid as high as 9 $\frac{7}{8}$ cents, delivered, for this material is questioned; however, it is reported that orders have been filled at 9 $\frac{3}{4}$ cents, delivered. Both trimmed and untrimmed arctics were firm at 7 $\frac{7}{8}$ and 6 $\frac{1}{8}$, respectively.

AUTO TIRES. Mixed tires have shown the most strength under a fairly good demand at 6 $\frac{3}{4}$ to 6 $\frac{7}{8}$ cents, delivered. There has been little interest taken in white G. & G. tires and prices are unchanged. Bicycle and solid tires have moved fairly well during the month and show a slight advance in price.

INNER TUBES. There has been very little doing in the various grades of tubes other than the usual movement in No. 1 grays and reds at prices ruling a month ago.

MECHANICALS. Nothing of importance has developed in this material, although hose received some attention during the month. Prices are about the same as last month.

London imports of waste and reclaimed rubber for October were 167,800 pounds; Liverpool, 30,000 pounds. Exports from London were 971,600 pounds; Liverpool, 465,700 pounds.

NEW YORK QUOTATIONS FOR CARLOAD LOTS DELIVERED.

NOVEMBER 24, 1916.

Prices subject to change without notice.

	Per Pound.
Boots and shoes.....	\$0.09 $\frac{3}{4}$ @ .10
Trimmed arctics .....	.075 $\frac{1}{2}$ @ .07 $\frac{1}{4}$
Untrimmed arctics .....	.06 $\frac{1}{8}$ @ .06 $\frac{1}{4}$
White tires, Goodrich and Goodyear.....	.08 $\frac{1}{2}$ @
Auto tires, standard white.....	.06 $\frac{1}{4}$ @ .06 $\frac{7}{8}$
standard mixed .....	.06 $\frac{3}{4}$ @ .06 $\frac{7}{8}$
stripped, unguaranteed .....	.04 $\frac{3}{4}$ @ .05
Auto peelings, No. 1.....	.09 $\frac{1}{2}$ @
No. 2.....	.08 $\frac{1}{4}$ @
Inner tubes, No. 1.....	.25 $\frac{1}{2}$ @ .26
No. 2.....	.11 $\frac{1}{2}$ @
red .....	.11 $\frac{1}{2}$ @
Irony tires .....	.02 $\frac{1}{2}$ @
Bicycle tires .....	.04 $\frac{1}{2}$ @ .04 $\frac{3}{4}$
Solid tires .....	.05 $\frac{1}{2}$ @ .05 $\frac{3}{4}$
White scrap, No. 1.....	.13 $\frac{1}{2}$ @ .14
No. 2.....	.10 @
Red scrap, No. 1.....	.10 @ .11
No. 2.....	.08 @
Mixed black scrap, No. 1.....	.04 $\frac{1}{4}$ @
No. 2 .....	.04 @
Rubber car springs.....	.04 @
Horse shoe pads.....	.04 $\frac{3}{4}$ @
Matting and packings.....	.01 @
Garden hose .....	.01 $\frac{1}{2}$ @ .01 $\frac{3}{4}$
Air brake hose.....	.06 @
Cotton fire hose.....	.02 $\frac{1}{2}$ @
Large hose .....	.01 @
Hard rubber scrap, No. 1, bright fracture.....	.26 @
Battery jars (black compound).....	.02 $\frac{1}{2}$ @
Insulated wire stripping.....	.03 $\frac{1}{2}$ @
Rubber heels .....	.03 $\frac{3}{4}$ @

THE MARKET FOR COTTON AND OTHER FABRICS.

Copyright, 1916.

NEW YORK.

THE cotton market has been subject to violent fluctuations during the past month and 20-cent cotton found ready buyers. The continued improvement in trade demand, combined with active buying in New York by Liverpool interests, were the attributed causes. Late in the month, however, the market became heavily long on both sides of the water and stop order selling was indulged in freely both in New York and Liverpool, on November 23, forcing prices down 96 points—a drop of \$4.80 a bale.

The opinion is freely expressed that 20-cent cotton is too high; that the mills are supplied with stocks, and therefore able to stay out of the market for some time. Moreover, it is pointed out that there is no actual shortage just now and only fear of shortage is the market's disturbing factor.

Under heavy buying on November 25, futures advanced 50 points, establishing prices within 11 to 19 points of the recent high record values, and wiping out the losses of \$5 to \$6 a bale in the interim.

EGYPTIAN COTTON. Fluctuations in Egyptians have been more violent than in the case of Americans. Mail from Alexandria under date of October 23 advises that the market, influenced by the firmness of Americans and that of Egyptians in Liverpool, combined with the reduced Egyptian crop estimates, forced contracts to \$30. The spot market has been very active and the volume of business quite fair, with prices about \$2 higher than contracts. A record price of \$40 was paid for Sakellarides. The tone of the market has been firm, and easier conditions are not anticipated unless some setback should occur.

Total exports from Alexandria for the period, August 1 to October 11, were 47,721 bales, of which Great Britain imported 36,271 bales; the Continent, 8,907; the United States, 2,233 bales; India and Japan, 310 bales.

SEA ISLAND COTTON. Both the Savannah and Charleston markets have been very active during the month and prices have advanced rapidly, showing a gain of 10 cents since our report last month. Heavy buying has been done at 50 cents and holders are asking 55 cents, which will doubtless be obtained should present conditions continue. Savannah stock on November 17 was 10,518 bales, against 13,507 bales a year ago. At Charleston the stock was 767 bales, against 1,149 bales a year ago.

MECHANICAL DUCK. The demand for hose and belting duck has been active; prices have advanced 2 cents a pound during the month and are closely approaching the 40-cent level. While the present prices seem high, the present market trend would indicate higher prices after the first of the year. The duck market has broadened out to a surprising degree, due to the shortage of leather, and manufacturers are substituting cotton duck wherever possible.

SHEETINGS, OSNABURGS, ENAMELING DUCK AND DRILLS. Comparatively speaking, there appears to be a somewhat easier market condition than last month for sheetings and Osnaburgs, although the demand is active at advanced prices and contracts call for March delivery. Drills are in good demand and prices have advanced. The mills have nothing to offer until the end of February. Enameling duck continues firm at advanced prices, with contracts dated May 1, 1917.

TIRE FABRICS. The advance in the price of building fabrics shows a gain of 15 to 20 cents for combed Sea Island and combed and carded Egyptian fabrics. Peelers have advanced 5 cents during the month. That still higher prices in the entire list are confidently expected is based on the belief that the Egyptian market is being manipulated. Sakellarides is higher than Sea Island, an unusual condition. No firm offers were being made, due to the uncertainty of raw materials.

During the last of the month easier market conditions were noted and it was reported that buyers who were prepared to pay

the prevailing high prices were accommodated. Possibly some of the large consumers have found it an advantage to release some of their contract deliveries.

That this market is being broadened by the shortage of leather is shown by the substitution of Sea Island fabric for the uppers of ladies' footwear.

However, the tire fabric situation is still under the influence of abnormal raw material conditions that bespeak uncertainty to consumers who are not covered.

NEW YORK QUOTATIONS.

NOVEMBER 24 1916.

Prices subject to change without notice.

Aeroplane and Balloon Fabrics:			
Wamsutta, S. A. I. L. No. 1, 40-inch.....	yard	\$0.32 1/2	at
No. 4, 38 1/2-inch.....		32 1/2	at
O/X B. 36-inch.....		Nominal	
Wool Stockinettes—52-inch:			
A—14-ounce.....	yard	1.25	@
B—14-ounce.....		1.50	@
C—14-ounce.....		1.75	@
Cotton Stockinettes—52-inch:			
D—14-ounce.....	yard	.50	@ .55
E—11 1/2 ounce.....		.42	@ .50
F—14-ounce.....		.55	@ .60
G—8-ounce.....		.48	@ .50
H—11-ounce.....		.50	@ .55
I—9-ounce.....		.42	@ .45
Colors—white, black, blue, brown.			
Interbay Stockinette.....	lb.	.59	@ .95
Tire Fabrics:			
17 1/4-ounce Sea Island, combed.....	square yard	1.20	@ 1.30
17 1/4-ounce Egyptian, combed.....		1.05	@ 1.15
17 1/4-ounce Egyptian, carded.....		1.02	@ 1.12
17 1/4-ounce Peelers, carded.....		.65	@ .70
Sheeting:			
40-inch 2.35-yard.....	yard	15.4	@
40-inch 2.50-yard.....		14.4	@
40-inch 2.70-yard.....		14	@
40-inch 2.85-yard.....		13	@
40-inch 3.15-yard.....		12 1/2	@
Osnaburgs:			
40-inch 2.25-yard.....	yard	16 1/2	@
40-inch 2.48-yard.....		15	@
37 1/2-in. 2.42 yard.....		15 1/2	@
Mechanical Ducks:			
Hose.....	pound	.38	@ .39
Belting.....		.37 1/2	@ .38 1/2
Carriage Cloth Duck:			
38-inch 2.00-yard enameling duck.....	yard	16	@
38-inch 1.74-yard.....		14 1/2	@
72-inch 16.66-ounce.....		.43	@
72-inch 17.21-ounce.....		.44	@
Drills:			
38-inch 2.00-yard.....	yard	18 1/2	@
40-inch 2.47-yard.....		15	@
52-inch 1.90-yard.....		12 1/2	@
52-inch 1.95-yard.....		19 1/2	@
60-inch 1.52-yard.....		25 1/2	@
Yarns:			
Garden Hose, 12/2 cabled.....	pound	Nominal	
Fire Hose 12/1.....		Nominal	
Imported Woolen Fabrics Specially Prepared for Rubberizing—Plain and Fancies:			
63-inch, 3 1/4 to 7 1/2 ounces.....	square yard	.38	@ 1.55
36-inch, 2 3/4 to 5 ounces.....		.35	@ .85
Imported Plaid Lining (Union and Cotton):			
63-inch, 2 to 4 ounces.....	square yard	.35	@ .75
36-inch, 2 to 4 ounces.....		.25	@ .50
Domestic Worsted Fabrics:			
36-inch, 4 1/4 to 8 ounces.....	square yard	3.21	@ 57 1/2
Domestic Woven Plain Linings (Cotton):			
36-inch, 3 3/4 to 5 ounces.....	square yard	.15 1/2	@ .20
Raincoat Cloth (Cotton):			
Bombazine.....	yard	.08	@ .08 1/2
Twills.....		.12	@ .18
Tweed.....		.25	@ .35
Tweed, printed.....		.07 1/2	@ .15
Plaid.....		.08 1/2	@ .10
Repp.....		.24	@ .27
Burlaps:			
32—7 1/2-ounce.....	100 yards	7.00	@
40—7 1/2-ounce.....		8.50	@
40—8-ounce.....		8.75	@
40—10-ounce.....		10.00	@
40—10 1/2-ounce.....		10.25	@
45—7 1/2-ounce.....		9.60	@
45—8-ounce.....		9.75	@
48—10-ounce.....		12.50	@



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Edited by HENRY C. PEARSON—Offices, No. 25 West 45th Street, NEW YORK.

Vol. LV. No. 4.

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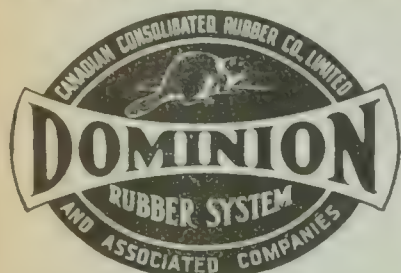
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THE INDIA RUBBER PUBLISHING CO.

No. 25 West 45th Street, New York.

Telephone—Bryant 2576.

CABLE ADDRESS: IRWORLD, NEW YORK.

HENRY C. PEARSON, Editor

Vol. 55

JANUARY 1, 1917

No. 4

SUBSCRIPTIONS: \$3.00 per year, \$1.75 for six months, postpaid, for the United States and dependencies and Mexico. To the Dominion of Canada and all other countries, \$3.50 (or equivalent funds) per year, postpaid.

ADVERTISING: Rates will be made known on application.

REMITTANCES: Should always be made by bank draft or Postoffice or Express money order on New York, payable to THE INDIA RUBBER PUBLISHING COMPANY. Remittances for foreign subscriptions should be sent by International Postal Order, payable as above.

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Entered at the New York postoffice as mail matter of the second class.

TABLE OF CONTENTS ON LAST PAGE OF READING.**THE RUBBER SYMPOSIUM POSTPONED.**

THE Rubber Symposium which was planned for the afternoon of January 8, Rubber Club Day, has been postponed. It was found that the day would be so full of business meetings, election of officers and features connected directly with the work of the Club, that little time would be left for the symposium. The plan has not been given up, however, and in connection with some later Club function it will undoubtedly be carried into effect.

ELECTRIC POWER IN THE RUBBER INDUSTRY.

ELECTRIC power has become a tremendous factor in American manufacturing. The individual motor has eliminated the great first cost, darkening and dirt-gathering propensities of overhead shafting, pulleys and belting, which consume considerable power and must be kept turning even though only a few machines are

being used. The electric motor entails no power drain except when the particular machine attached to it is in operation. That rubber manufacturers have been quick to avail themselves of these advantages is shown by the Census of Manufactures for 1914, the latest available figures of the Department of Commerce. It appears that of the 199,543 total primary horse-power employed in the manufacture of rubber goods in the United States, 114,803, or 57.5 per cent, is electric. The further fact that of this 114,803 horse-power 33,983, or 42 per cent, is rented, instead of being generated in each establishment, clearly indicates the importance of an article entitled "Late Developments of the Electric Drive in Rubber Mills," on another page of this issue.

THE AMERICAN RUBBER INDUSTRY AFTER THE WAR.

A PARAGRAPH in the economic convention between the Allied Nations, drawn up in Paris last summer, is becoming a source of increasing concern to the American rubber trade. It reads as follows:

The Allies declare themselves agreed to conserve for the allied countries, before all others, their natural resources during the whole period of commercial, industrial, agricultural and maritime reconstruction, and for this purpose they undertake to establish special arrangements to facilitate the interchange of these resources.

It is an indisputable fact that the future of the great American rubber industry, which uses two-thirds of the world's production of crude rubber, rests with the British Government. There is not enough Para rubber to supply the wants of this country, even if every pound of it came here, and all the rubber grown in the Malay States, Sumatra and Java is completely in the hands of England and Holland. The British Consul General in New York is able to satisfy present requirements, and while it is unlikely that England or Holland would deny such an important customer as the United States, there is always that possibility. Opinion differs among American business men as to the probable outcome. Some are doubtful if the Allies will be able to carry out their program of preferential trading, whereas others express the growing fear that the restrictions imposed upon American importers on the plea of maritime necessity will be continued after the war, when England, Germany and the United States will all be keen competitors for world trade. In this race for business it is realized that England will have a big advantage, for through her present control of the imports of raw materials she has ascertained by whom sold, the prices paid and ultimate destination of all goods manufactured with raw materials coming from British possessions. She has built up in this country a strong machine for the control of our war trade, which might be

used to regulate our imports to the requirements of the Allies after the war and thus see to it that their needs and interests have priority over all others.

Consul General Clive Bayley, however, is discreetly silent regarding the future policy of the Allies with respect to crude rubber imports as affected by the Paris Convention, although the Foreign Trade Council, the Merchants' Association of New York and the American Manufacturers' Export Association are all making inquiries and have lodged pertinent questions with the administration at Washington. Certainly this irksome situation, together with England's contemplated protective tariff, holds possibilities that may prove detrimental to American interests. Viewed in this light the imperative need of an adequate supply of rubber grown within our own borders as soon as possible becomes more than ever apparent. Meanwhile the fourth convention of the National Foreign Trade Council, to be held at Pittsburgh, Pennsylvania, January 25, 26 and 27, has for its purpose the earnest consideration of the many serious problems besetting our foreign commerce, and it is to be hoped that a scheme for a more satisfactory working arrangement may be evolved.

RUBBER AND AN AMERICAN MERCHANT MARINE.

THE rubber industry, dependent as it is upon merchant ships to maintain the supply of crude rubber, looks with approval upon the tendency toward control of American shipbuilding manifested by the purchase of the American Shipbuilding Co. by the American International Corporation. Imports from the Far East have already been greatly delayed by the shortage of ships, and it is hoped that this new and broader policy of our greatest American shipbuilding company may relieve the situation.

The need of such a course is seen in the fact that almost every great nation except the United States has followed the example of the British admiralty in forbidding the transfer of ships to another flag for a period of three years after the close of the war. American owners and shipbuilders, on the contrary, may sell where they please until the new shipping act goes into effect, and afterwards as soon as the Shipping Board's appropriation for the purchase of ships has been exhausted. Thus the whole world is free to buy ships of us, while we can have only those we build ourselves, and our growing foreign trade is to a degree in danger for want of bottoms in which to transport it. Of the 1,300,000 tons of merchant ships under contract in American yards over 300,000 tons are being built on foreign account, and it is certain that wider control of the shipyards by American shipping interests will tend to build up an American merchant marine and supply one of our greatest needs.

At the outbreak of the war the world's merchant shipping amounted to about 49,000,000 tons, and at the normal rate of increase should now be 53,000,000 tons. As a result of losses by submarine destruction, the

unusual amount of repair work and greatly increased naval construction, it is estimated that the supply of ships cannot be restored to normal before 1922. Meanwhile war conditions in England have raised the cost of ship construction to equal that in the United States, and American shipping interests now see their opportunity to enter this field on equal terms. In the past our shipbuilders have never had under construction enough ships of one type to permit the introduction of methods and economies ordinarily practiced in bulk production. Systematized process manufacturing has enabled America to turn out reapers, automobiles, tractors, etc., more cheaply than any other nation, and shipbuilders feel that the opportunity at last presents itself to apply similar methods to their line as well.

COTTON AND THE 1917 TIRE FABRIC DEMAND.

RUBBER and cotton are the two staple raw materials of primary importance for the manufacture of automobile tires. In 1916 the American tire industry alone consumed practically half the world's 1915 production of crude rubber, and 85 per cent of the United States Sea Island cotton crop. It is estimated that 25,000,000 tires will be made in 1917. But the yield of plantation rubber has advanced to meet it, and while the supply of Sea Island and Egyptian cotton will probably be adequate, there are shipping difficulties and questions of loom capacity that must be considered.

Sea Island cotton has the preference for tire fabrics because of its great strength. Although it is now grown on the mainland of South Carolina, Georgia and Florida near the sea, the entire American crop for the season of 1915-16 ending July 31 was only 91,920 bales, of which 2,727 bales were exported to England and the Continent. About 85 per cent of the American consumption was used to meet the 1916 demand of about 150,000 bales, and Egyptian cotton supplied the rest. The British West Indies, during the past decade, have been highly successful in growing a long-fiber cotton with seed obtained from the famous Colonel Rivers plantation off the South Carolina coast.

In view of the inadequate supply of Sea Island cotton it is not surprising that those forehanded American manufacturers who have gone into plantation rubber in the Far East should turn their attention to the other principal raw material for tire building. Already one large firm has purchased a tract of 10,000 acres in the South on which to grow Egyptian cotton, and the indications are that others will probably enter this field.

Much study has been devoted of late to the idea of providing an adequate rubber supply within our own borders. Long-fiber cotton is equally important; and as the culture of high-grade Sea Island and Egyptian cotton has proved a success along the southern seaboard and in the South, is not its extension to meet our requirements an equally important piece of industrial preparedness?

The Year 1916 in Review.

A RETROSPECT of the twelvemonth just brought to a close leaves no doubt that it has been the greatest year of the rubber industry. Production has increased tremendously in most lines; factory enlargements have become the commonplace news of the day, but the great outstanding feature of the year has been the phenomenal growth of American tire manufacture, which alone consumed practically half the world's 1915 production of crude rubber. While shipments of wild rubber decrease, the production of plantation rubber has increased, and thanks to the British Government, has been obtainable at virtually normal prices despite the extraordinary demands and impediments of the war.

The growth of tire manufacture is graphically reflected in the patents issued. Fully half of the 1916 American patents relating to rubber apply to tires and treads, tire building and repair machines, looms for tire fabrics of special weave, vehicle wheel rims and rim fastenings for the application of pneumatic, cushion and solid tires. There were nearly a hundred patents issued relating to machines used in tire construction. Its growth is also evidenced by record breaking exports, which, for the eight months ending August, 1916, were valued at double those for the corresponding period of 1915, including \$11,772,908 worth of automobile tires, which went chiefly to England, Australia, Russia, New Zealand and Canada. Stock value is always a certain index of the condition of a business, and shares in several leading tire companies that formerly sold below their \$100 par value have recently been quoted at \$257, \$292.50, \$328 and one even as high as \$1,650. During this period of expansion the non-skid tread has triumphed, and there is a marked tendency on the part of motor-car manufacturers to adopt the S. A. E. standardized schedule of tire sizes and oversizes.

Meanwhile, the achievements of rubber chemists have been no less notable. They are rapidly making rubber manufacture an exact science. This is true of improved methods of analysis and aging tests, and particularly so of accelerators. Beginning with the use of aniline oil they have added to the list until 30 or 40 accelerators are now known with which to cut the previous period of vulcanization in half, or better, and thus double production. The advent of pressure cure as a substitute for the orthodox dry heater has notably modified footwear manufacture and may influence the time-honored methods of making clothing, mackintoshes and carriage cloth. Another advance in footwear is the development of combination rubber and fiber or leather soles on a commercial scale, to offset the ever increasing shortage

of sole leather. Improvements have been made in methods of cold vulcanization, and important investigations in Russia indicate the possibility of hot vulcanization without sulphur. American chemists have been struggling with the problem of a new motor-car fuel and believe that by utilization of various by-products and waste, enough industrial alcohol can be provided, which will greatly reduce the cost of solvent naphtha for rubber use. The marked tendency of American chemists toward greater frankness in discussing improved methods for the common good augurs well for the future. In Germany synthetic rubber has been improved but little and apparently no way has been found to reduce its cost, while the attitude of American chemists is largely one of scientific interest.

The war has proved that rubber is not a luxury but a necessity. Its principal uses in warfare are too well known to require enumeration here, but the chief developments of the present conflict are the enormous demand for tires and for rubberized fabric used in the manufacture of army equipment and in the construction of aeroplanes and balloons. There are myriad ingenious uses of rubber, too, but none compares with the marvels of surgery in mending broken soldiers with it—replacing broken noses, jaws and teeth, and grafting skin and flesh to cover them. Its increased applications in the building of artificial limbs are also notable.

The prosperous condition of rubber manufacture in America has rendered possible much highly commendable welfare and educational work, which makes for far greater health and contentment of employes as well as maximum output in the factories. This spirit of improvement has also affected mill conditions from the standpoint of health and safety. The industry has grown so rapidly that for the most part it is conducted in buildings of modern fireproof construction, light, well-ventilated, and equipped with excellent sanitary and safety devices. It is not surprising, therefore, that although minor strikes have been of frequent occurrence, most of them have been settled without difficulty.

The past year has proved a revelation even to the most optimistic and far-sighted rubber men, but with our well-equipped factories, the supply of rubber tolerably assured, the automobile industry still growing, and the nations beyond the seas depending upon us more and more to supply their needs, there is every indication that the coming year will outstrip it. In this connection it is confidently believed that The Rubber Club of America, Inc., will continue to grow in prestige and membership, as it has in the past, and to exert a steady influence of distinct benefit to the whole industry.

A Brief Review of the Organic Accelerators.

The following summary represents an effort to classify the principal nitrogen-bearing accelerators in a logical manner, and to record concisely their characteristics and efficacy as described by R. Ditmar and translated into French for "Le Caoutchouc & la Gutta-Percha" by Georges Noyer; Andrew H. King in "Metallurgical and Chemical Engineering"; S. J. Peachey in "The India Rubber Journal"; and others.

WHATEVER may be the future of synthetic rubber, the investigations in connection with it led to the discovery of organic accelerators, which have revolutionized several lines of rubber manufacture. It was found that synthetic rubber could not be vulcanized without the presence of certain organic catalyzers to facilitate the union of rubber and rubber-like substances with sulphur, and when all natural rubber was substituted the increased rapidity of vulcanization was truly remarkable. The difficulty, as for a time with plantation rubbers, appears to have been the absence of certain so-called impurities found evenly distributed throughout Para rubber coagulated by the Amazon method. These natural catalyzers of rubber latex are believed to be decomposition products and related to the proteins. It is certain that all organic accelerators yet known are nitrogen-bearing and many have amino groups, so that the function of nitrogen appears to be important.

Manufacturers who had been using the old, well-known mineral accelerators began to experiment with these new organic catalyzers and found that they could double their output without expensive increase of steam pressure or danger of impairing the product by high temperature. Those engaged in the production of cheap molded goods discovered that by employing both high temperatures and catalyzers their increased output would take care of overhead as never before.

While this most important recent development in rubber chemistry is still in its infancy, there is already considerable generalization and a goodly amount of definite facts on which to build. It is thought that, unlike the mineral accelerators which undergo no chemical change during vulcanization, an organic catalyzer unites with one of the reacting substances and forms an unstable compound which then reacts with the other substance. Meanwhile the catalyzer is set free and the entire process is repeated. From a mechanical standpoint a catalyzer is most conveniently mixed when a solid capable of being very finely pulverized. A high boiling point is essential to prevent vaporizing during vulcanization and consequent spongy appearance, known as "blowing."

The following list includes the most important organic accelerators now in use.

Carbon bisulphide addition products with

Aniline
Diphenylthiourea or thiocarbonylurea
Dimethylaniline
Tetrahydropyrrole
Dimethylamine
 $\beta\beta$ Dimethyl α methyl trimethylene amine

Ammonium compounds

Ammonium borate
Aldehyde ammonia
Quaternary ammonium bases

Amino compounds

Accelerene or paranitroso dimethylaniline
Para-phenylenediamine
Tetramethylenediamine
Hexamethylene-tetramine or hexamethylenamine or formalin
Sodium amide
Naphthylenediamine
 $\beta\beta$ Dimethyl Δ trimethyleneimine
Trimethylenamine
Benzylamine
Nitrosodimethylaniline

Piperidine and derivatives

Piperidine or aminopentane
Methyl piperidine

Quinoline and derivatives

Quinoline
Quinoline sulphate or quinoline sulphonie acid.
Hydroxy quinoline
Quinosol
Oxiquinoline
Oxiquinoline sulphonie acid
Oxiquinoline sulphide

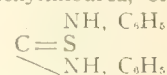
Miscellaneous

Anthraquinone
Antipyrine
Naphthylamine
Urea derivatives
Anilides
Formanilide
Thioformanilide

Several of these accelerators are covered by patents and cannot be bought of the concerns manufacturing them until a license for their use has been obtained from the patent owners. Applications for such licenses should be addressed to Dr. Hugo Schweitzer, of the Synthetic Patents Co., 115 Hudson street, New York City. Prices will be quoted to license holders. The catalyzers in question are piperidine and methyl piperidine, tetramethylenediamine, hexamethyl-tetramine, thiocarbonylurea, and aniline hydrochloride. The first three of these are not made in the United States at present.

CARBON BISULPHIDE ADDITION PRODUCTS.

With Aniline: Diphenylthiourea, or thiocarbonylurea,

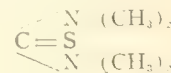


is one of the earliest known organic accelerators. It takes the form of large colorless tablets melting at 154 degrees C., and is a very efficient catalyzer, particularly for quick-curing stocks because it does its work at the very beginning of vulcanization. The proportions used vary from $\frac{1}{2}$ to 3 per cent.

With Dimethylaniline: Cited by Ditmar and King.

With Tetrahydropyrrole: $(\text{CH}_2)_4\text{NH}$. Known as pyrrolidin in Germany. Cited by Ditmar and King.

With Dimethylamine: This substance,



gives an active addition product. With Para, 100 per cent sulphur and the addition of 1 per cent of the compound of carbon bisulphide and dimethylamine vulcanization takes place completely with 15 minutes' cure at 135 degrees C. (German patent 269,512.)

With $\beta\beta$ Dimethyl α methyl trimethylene amine: Cited by Ditmar.

AMMONIUM COMPOUNDS.

Ammonium borate: This has a noticeable effect on the cure, but the fact is only of scientific interest, according to Ditmar.

Aldehyde ammonia: $\text{CH}_3\text{CH(OH)NH}_2$. This very satisfactory catalyzer is readily soluble in water, sparingly soluble in alcohol and almost insoluble in ether. It melts between 70 and 80 degrees C. and sublimes without decomposition at 100 degrees C. Its efficacy as an accelerator, according to King, may be seen in the fact that 100 parts Para, 10 parts sulphur, and 1 part aldehyde ammonia will cure in 30 minutes at 45 pounds steam pressure, 140 degrees C. (Ditmar says 1 hour at 3 atmos-

phers—42 pounds—while without the accelerator 2 hours would be required), whereas 90 parts Para, 9 parts sulphur, and 1 part lime require 85 minutes at the same pressure for a cure.

Quaternary ammonium bases: These are covered by Bayer & Co., patents of 1914 together with aldehyde ammonia, paraphenylenediamine, sodium amide, benzylamine, and naphthylendiamine, all rapid accelerators.

AMINO COMPOUNDS.

Accelerene: This widely used English catalyzer is among the most powerful known accelerators. When used in the proportion of $\frac{1}{3}$ to $\frac{1}{2}$ of 1 per cent it reduces the required period of vulcanization to one-third normal with highly satisfactory results; and in conjunction with certain other familiar substances in quick repair compounds reduces the period of cure to one-eighth normal. Cheap mixings containing considerable reclaim or waste, particularly if golden antimony sulphide be present but no free sulphur, do not respond so readily as medium and high-class mixings. In such cases sufficient free sulphur must be added and the proportion of antimony sulphide may be reduced to that needed to give the desired color, after which the usual acceleration will be attained. In the manufacture of vulcanite the addition of $\frac{3}{4}$ of 1 per cent of accelerene to a mixture consisting of 100 parts rubber and 40 parts sulphur reduced the period of vulcanization from 6 to 2 hours, yielding a hard and very durable product.

Essentially paranitroso dimethylaniline, and wholly different from the German type of accelerators, accelerene owes its activity to the presence of the nitroso group, and not to feeble basic properties. Aside from its high acceleration it possesses several characteristics in use that are of great value. Goods vulcanized in its presence show somewhat greater tensile strength, probably due to the diminished degree of depolymerization possible in so short a period of heating. Vulcanization stops when the goods are taken from the pan or press, so they suffer little deterioration in storage, tests of this now covering a period of two years. Sulphuring-up may also be entirely prevented by its use, though at the sacrifice of acceleration. The quantity of sulphur may be reduced to 3 or $3\frac{1}{2}$ per cent, $\frac{1}{2}$ per cent of accelerene is then added and the mixing cured in the ordinary manner. As employed for this purpose the catalyzer facilitates a complete combination of rubber and sulphur, with the result that little or none of the latter remains in the rubber.

Para-phenylenediamine: $C_6H_4(NH_2)_2$ $\begin{matrix} NH_2 \\ \wedge \\ V \\ NH_2 \end{matrix}$ This very

poisonous catalyzer melts at 140 degrees C., sublimes without decomposition at 267 degrees C., is readily soluble in alcohol and ether, and moderately so in water. In Bayer & Co.'s German patent No. 280,198, January 1, 1914, it is stated that this accelerator gives good satisfaction with synthetic rubber, 100 parts isoprene rubber having been cured completely upon being mixed with 10 parts sulphur, 2 parts paraphenylenediamine and being heated in a press for 15 minutes at 45 pounds steam pressure.

Tetramethylenediamine: $NH_2(CH_2)_4NH_2$ Known also as putrescine, this is a natural product of protein decomposition formed during the putrefaction of animal matter such as fish. It is produced chemically by Bayer & Co.

Hexamethylene-tetramine: Known also as Hexamethyleneamine and *Formin*.

Miscellaneous Amines: Other amino compounds cited by King as of lesser importance yet having some accelerating power include: sodium amide, $Na NH_2$ (rapid acceleration according to Ditmar); naphthylendiamine, $C_{10}H_8(NH_2)_2$ (rapid acceleration according to Ditmar); trimethyleneamine $(CH_2)_3N$; benzylamine, $C_6H_5CH_2NH_2$ (rapid acceleration according to Ditmar); $\beta\beta$ dimethyl Δ trimethyleneimine; and nitrosodimethylaniline.

PIPERIDINE AND DERIVATIVES.

Piperidine or Aminopentane: $C_5H_{10}NH$. A liquid miscible in water in all proportions, having a specific gravity of .881 at 0 degrees C., boiling at 105.7 degrees C., and smelling like pepper and ammonia. This, the prototype of the more recently discovered organic catalyzers, was brought out and patented by Bayer & Co. in 1912 for use in the manufacture of synthetic rubber, but its extraordinary value as an accelerator in connection with natural rubber for both hard and soft rubber articles soon overshadowed its original purpose. A mixture of 100 parts Para and 10 parts sulphur that requires an hour to cure at 53 pounds, steam pressure may be cured perfectly with only 15 minutes' heating by the addition of $\frac{1}{2}$ part piperidine. The product obtained from this compound contains about 3.5 per cent of combined sulphur. Piperidine may also be used for producing hard rubber by adding 25 per cent sulphur. (German patent 266,618.)

Methyl piperidine: $C_6H_{10}(CH_3)$. This active catalyzer boils at 107 degrees C.

QUINOLINE AND DERIVATIVES

Quinoline: C_8H_7N $\begin{matrix} CH: CH \\ N = CH \end{matrix}$ While this is a good accelerator,

its derivatives, the sulphate and quinosol, are more frequently used because of the ease of mixing. Quinoline has a specific gravity of 1.0947 at 20 degrees C.; it boils at 240 degrees C.; and is soluble in alcohol and ether, but only sparingly so in water. Its odor is disagreeable and penetrating; its taste, bitter and acrid; and on exposure to moist air is converted to the hydrate. As an accelerator the amount used is 2 or 3 per cent. Quinoline does not appear to enjoy accelerating power, according to Ditmar.

Quinoline sulphate: Also known as quinoline sulphonic acid. An excellent accelerator yielding good-looking, well-vulcanized rubber. King suggests that the potassium salt of this acid might give better results.

Hydroxy quinoline: This derivative, which ought to prove a valuable accelerator, takes the form of prismatic needles melting at 76 degrees C. and boiling at 266.6 degrees C. under 752 mm. pressure. Although readily soluble in alcohol and volatile with steam it is only sparingly soluble in cold water.

Quinosol: This accelerator takes the form of sulphur yellow needles soluble in both alcohol and water. It is manufactured by Frisch, of Hamburg, Germany, and mixes easily with rubber compounds before vulcanization. In a mixture of Peruvian rubber, 12 kilograms; white substitute, 19 kilograms; Kaolin (China clay), 2 kilograms; chalk, 5 kilograms; and sulphur, 4.5 kilograms, the accelerating effect, according to Ditmar, is not great, but quinosol acts quite differently when mixed with litharge and crude rubber free of substitute, the combined effect being greater than the sum of the effects of each employed alone. This fact is of great importance to rubber footwear manufacturers who use mixtures containing litharge exclusively, as they can cut the period of vulcanization in half by using 2 to 3 per cent of quinosol.

Oxiquinoline: Cited by Ditmar.

Oxiquinoline Sulphonic Acid: Gives good acceleration but very porous rubber, according to Ditmar.

Oxiquinoline sulphide: This is a satisfactory but too active accelerator. It can be used with all sorts of compounds because it answers all the needs of the industry. In tests conducted by Ditmar in collaboration with the Japanese chemist Nawa-Naami, a mixture containing Peruvian rubber, 40 kilograms; brown rubber substitute, 10 kilograms; paraffin, 5 kilograms; chalk, 41 kilograms; and sulphur, 4 kilograms, required 2 hours' heating at a pressure of 4 atmospheres (56 pounds). With oxiquinoline sulphide the mixture was vulcanized in 50 minutes. With quinosol sulphate 75 minutes was required. Tests of accelerated and

unaccelerated products showed the same breaking point, but the effect of the rubber substitute was found to have been reduced one half.

Anthraquinone: Recommended in 3 to 5 per cent strength in batches containing rubber substitute. In a typical mixture containing rubber substitute it reduces the duration of vulcanization from 2 hours to one-half hour.

Antipyrine: Acts like anthraquinone. (Ditmar.)

Naphthylamine: Acts like anthraquinone. (Ditmar.)

Urea: This and such derivatives as *guanidine* have been found useful. (King.)

Formanilide: Many patents cover the anilides, such as formanilide, $C_6H_5.NH.CH_3O$.

Albumen: The direct addition of proteins to rubber, as described by W. Esch in German patent No. 273,482, November 22, 1912, presents an interesting possibility. The protein, usually egg albumen, 15 parts, is mixed with 2 parts hydrated lime or magnesium hydroxide to form a paste. Low grades of rubber, when mixed with this paste, dried, sheeted and smoked to render the albumen insoluble, are considerably improved thereby.

GASOLINE FROM OIL SHALES

Probably the advancing cost of gasoline and other products derived from petroleum will one day render profitable the distillation of the vast deposits of so-called hydrocarbon shales of the Green river formation of northwestern Colorado and northeastern Utah. The United States Geological Survey has been investigating these deposits for three years past, and the director in his report states that very rough but cautious calcu-

lations indicate that the distillation of shale from beds over three feet thick in Colorado alone will yield more than 20 billion barrels of crude oil from which 2 billion barrels of gasoline can be extracted. A detailed report of these investigations, with a statement of the possible gasoline production by the Rittman process, is now in press.

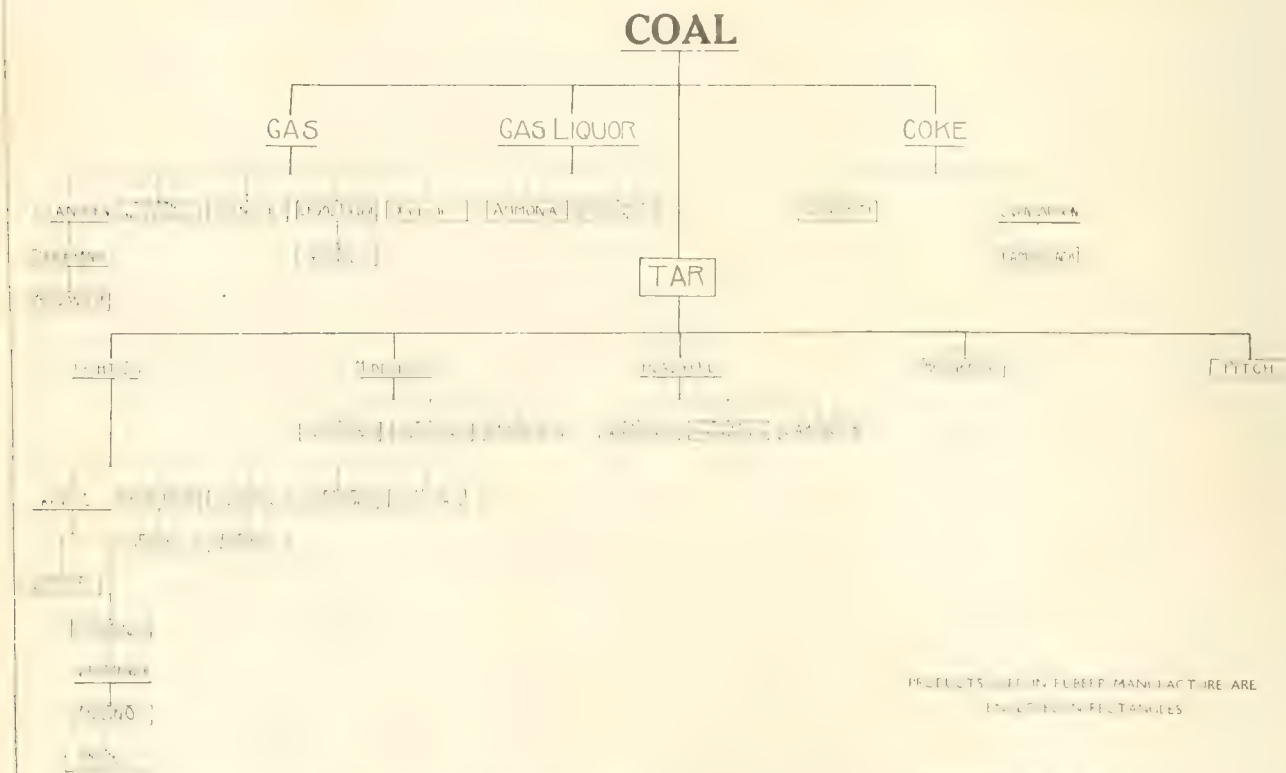
HEAVY AMERICAN EXPORTS DUE CHIEFLY TO THE WAR

THAT the European war has been principally responsible for our tremendously increased exports of the past year is incontrovertibly shown by the official Commerce Reports of the United States. Our exports for the ten months ending October, 1916, amounted to \$4,443,326,271, of which shipments to the value of \$3,541,446,875 went to the Allies and their colonies, whereas our entire exports to all other countries totaling \$901,879,396, only slightly exceeded one-fourth those to belligerent countries. Considering only commodities suitable for military and naval purposes our export trade for the ten months ending October, 1916, amounted to \$2,541,733,040 as compared with \$549,369,725 for the corresponding period of 1914, or nearly a five-time advance.

The following items are of particular interest to the rubber trade:

	Ten Months Ending,		
	Oct., 1914.	Oct., 1916.	Increase.
India rubber, including automobile tires	\$9,587,180	\$28,685,814	\$19,098,634
Chemicals, including sulphuric and		134,370,958	111,478,926
Lead from domestic ores	3,635,753	11,786,901	8,151,148
Zinc and manufactures	4,713,944	48,451,130	43,737,186
Mineral oils	120,638,004	171,653,836	51,015,832

DIAGRAM OF THE PRODUCTS DERIVED FROM COAL USED IN RUBBER MANUFACTURE



COAL-TAR PRODUCTS OCCUPY AN IMPORTANT PLACE IN RUBBER MANUFACTURE. IN ORDER TO GRAPHICALLY SHOW THESE DERIVATIVES AND THEIR SOURCES, THE ABOVE DIAGRAM HAS BEEN CONSTRUCTED FROM DATA COURTEOUSLY FURNISHED BY THE BARRITT CO., NEW YORK CITY.

Late Developments of Electrical Drives in Rubber Mills.

By William H. Easton, Westinghouse Electric & Manufacturing Co.

AS in most other lines of manufacturing, electric power is coming to be widely used in rubber factories, for the individual electric motor to drive each machine has much to recommend it. As a rule, rubber manufacturers prefer to generate their own electric power, believing it more economical.

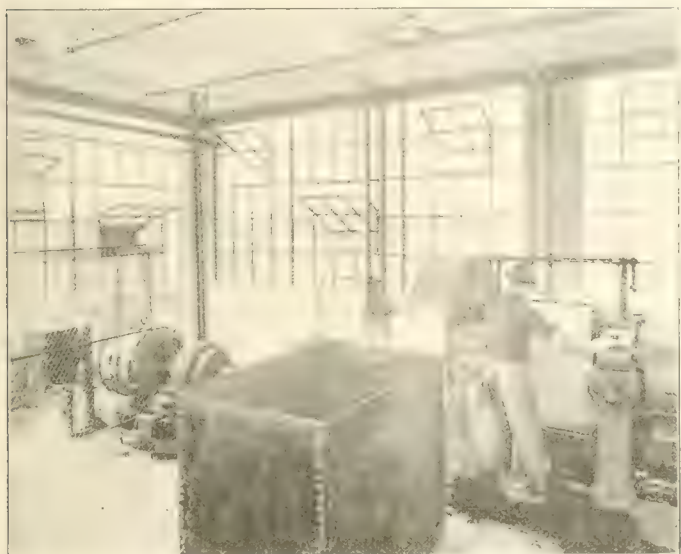


FIG. 1.—HIGH VOLTAGE 100-HORSE-POWER MOTOR DRIVING TWO RUBBER WASHERS.

owing to the fact that large quantities of steam have to be produced for vulcanizing purposes. But electrical engineers have been able to convince several progressive rubber manufacturers that even greater economy lies in another direction and that there are also other attendant advantages. For instance, power for a new and thoroughly modern factory recently erected for the manufacture of automobile inner tubes is not produced at the plant, but supplied by a central station. The advantages claimed for this somewhat unusual service include the saving of the cost of engines, generators, extra boilers and auxiliaries; the ability to obtain power at any time, night or day, without the presence

of the engine room force; the assurance of more reliable power, and lower operating costs.

It would seem, therefore, that many rubber mills might adopt such a system with benefit, and as the installation mentioned presents some interesting departures from ordinary usage, a description of its salient features may prove interesting.

Alternating current at 2,200 volts is received from the central station lines. Part of this current passes through transformers and is reduced to a low voltage for lighting and operating some small motors, but most of it is used at full voltage. Both high and low voltage lines lead to the main switchboard from which the power is distributed throughout the plant.

The motors used in the first three steps of the process are all applied in the same way and are similar in type. Each is a Westinghouse 2,200-volt, alternating current, slip-ring motor, the details being as follows:

Fig.	H.P.	R.P.M.	Machines Driven.
1	100	285	Fig. 1. Four Birmingham washers.
2	200	500	Three 20 x 50-inch Birmingham mills.
3	260	500	Two 20 x 50-inch Birmingham warming mills. A 75-kilowatt Westinghouse direct-current generator for supplying current to the calender motor.

It will be noticed that these motors are of the same voltage as the Central Station lines. If motors of lower voltage had been selected it would have been necessary to install transformers, but under the circumstances this expense is avoided. As can be seen from the illustrations, these motors are all enclosed by wire netting so that there is no danger of unauthorized persons coming near them.

Slip-ring motors are used instead of squirrel-cage motors, because a squirrel-cage motor in starting ponderous machinery of this kind draws a very heavy current from the line; but with a slip-ring motor the starting current can be kept down to very nearly the full load value. The motor is started with resistance in the rotor circuit, which is cut out gradually by means of a drum controller as the motor speeds up. The drum controller and resistance handle only the low voltage rotor current. An oil circuit breaker connects the motor to the high voltage line and automatically disconnects it in case of an overload.

In order to stop the washers and mills quickly in case of emergency, each machine is equipped with a Cutler-Hammer magnetic clutch and brake. Safety switches are located convenient

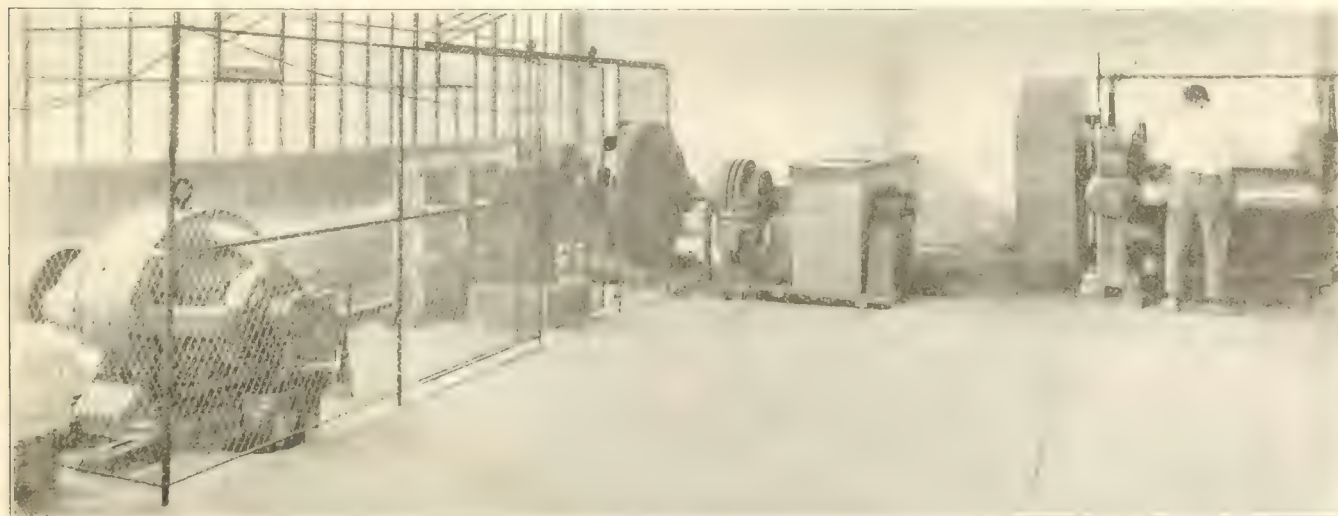


FIG. 2.—GENERATOR SUPPLYING CALENDER MOTOR. ALSO 200-HORSE-POWER MOTOR DRIVING TWO WARMING MILLS.

to each operator and when any one of these is operated, the clutch opens, disconnecting the rolls from the motor, and the brake is applied to the rolls, stopping them almost instantly. Both brake and clutch are operated by direct current supplied by a small motor-generator set.

A 24 x 66-inch Birmingham calender is driven by a Westinghouse 75-horse-power, 230-volt, direct-current motor supplied with current at both 120 and 240 volts from the generator shown in Figure 2. It is evident that it would be less expensive to drive the calender with an alternating-current motor which could take its current directly from the line and thus eliminate the generator; but a direct-current motor is preferable, because there is no practicable method of getting satisfactory speed variation with an alternating-current motor, whereas with a direct-current motor any desired speed range can be obtained. In the present instance the highest speed of the calender is four times its lowest speed and there are 22 steps between, so that every calendering operation can be carried on at the most suitable speed.

Another interesting point is the use of current at two voltages for this motor. It is easily possible to build a motor that will provide a 4 to 1 speed range on one voltage, but such a motor would cost considerably more than the present one, which provides only a 2 to 1 speed range on each voltage; and since the use of two voltages adds but little to the cost of the generator and the controller, a less expensive outfit is provided.

The calender controller, which is of the Westinghouse automatic type, consists of two principal parts: a drum controller and a panel on which are mounted various automatic switches; while on the calender itself are placed "start" and "stop" buttons. When the operator desires to start the calender he moves the drum controller handle to the notch which he knows from experience will correspond to the speed he desires; he then presses the "start" button. The motor now starts and comes up to speed, the magnetic switches on the panel automatically making the proper connections. Should a change of speed be desired, the controller handle is moved in either direction, causing the motor to change its speed to correspond. Pressing the "stop" button not only cuts off the current but causes dynamic braking connections to be made by the automatic switches, which brings the calender to an abrupt stop. Safety switches, operated by means of ropes hanging down on each side of the calender, stop the calender in the same way.

The Royle tubing machines, which form inner tubes, are driven by 20-horse-power, 220-volt, 685-r.p.m., Westinghouse squirrel-cage motors. The drying rolls, the grinding and buffing wheels, and the machine tools in the machine shop are also motor driven.

NEW POLICY OF BUYING RUBBER-COVERED WIRE.

Manufacturers and jobbers are making a better profit in rubber-covered wire today than ever before. The demand is large and the output is not sufficient. Rubber-covered wire, being a staple, never was very profitable for the jobber. Until quite recently it was sold on a basis of the best price. Thus a buyer would place an order at today's prices, say 21 cents, for four months' delivery. If at the delivery date the prevailing price was 18 cents the buyer expected this price and received it, although the contract was made at 21 cents. If, on the other hand, the price had advanced to 23 cents the buyer held to the contract price of 21 cents. The buyer therefore was protected against any advance in the market but he also received the benefit of any decrease in market prices.

Under such a scheme it was nothing more than heads the buyer wins, tails the seller loses. With the margin of profit always small it often reached the vanishing point on a rising market. Today, however, all of this has been changed. Wire is bought at the delivery market price of copper-wire base. The jobber buys this way from the manufacturer and the contractor from the jobber. The benefits of a rising market are now going to the seller. [Electrical World.]

FOREIGN IMPORT DUTIES ON RUBBER SPONGES.

THE accompanying statement of foreign import duties on rubber sponges imported into the various countries given, has been corrected to December 1.

When two or more rates of duty are shown for the same article, products of the United States, as a rule, are admitted at the lowest rate ("conventional" or "minimum"), except: (1) Into France and French colonies, where, in the case of most articles, the "general" rate is applied; (2) Into Canada, where the "general" rate is applied; (3) Into other British colonies, where the "preferential" rates, if any, are withheld from all non-British imports.

While every care has been taken to insure accuracy, the rates are not guaranteed and it is advisable to make small trial shipments to test them. As changes in the duties are likely to occur at any time, frequent verifications are advised. The surtaxes noted in the South American table have not been added to the rate.

FOREIGN IMPORT DUTIES ON RUBBER SPONGES. Rate per 100 Kilos. (220 Pounds.)

EUROPE:		Weight.	General.	Con- vention.	Rate per cent ad valorem.
Austria-Hungary	Net		\$20.00	\$16.00	10
Belgium	Net				
Bulgaria	Net		58.00		
Denmark	Net		18.75		
Finland	Net		11.34		
France	Net		72.37	48.25	
Germany	Net		9.52	9.52	
Greece	Net		77.20		
Italy	Net		9.65	9.65	
Netherlands	Net				5
Norway	Net		34.84	26.80	
Portugal	Net		45.60		
Roumania	Net		9.65	9.65	
†Russia	Net		113		
Serbia	Net		86.85	29.00	
Spain	Net		115.00	77.00	
Sweden	Net		32.16		
Switzerland	Gross		7.72	4.82	
Turkey	Net			52.80	
United Kingdom	Net		Free		
SOUTH AMERICA:			Valuation.	[2.2 Pounds.]	
Bolivia	Gross		\$1.55		25
(Surtax, 2 per cent of official valuation.)					
Colombia	Gross			\$1.00	
(Surtax, 2 per cent of duty.)					
Ecuador	Net			.145	
(Surtax, 125.5 per cent of duty.)					
Paraguay	Net		4.82		42
(Surtax, 1.5 per cent ad valorem, based on official valuation.)					
Peru	Net		.729		
(Callao, Salaverry, Paita and Pisco, surtax, 10 per cent of duty. ports surtax 8 per cent of duty.)					Other
Uruguay	Net				31
Venezuela	Gross			.482	
(Surtax, 56.55 per cent of duty.)					

* Rate per 100 Okes [2.822 pounds].

† Rate per Funt [142½ ounces].

Compiled by the Bureau of Foreign and Domestic Commerce, Washington, D. C.

AMERICA'S FIRST NAVAL DIRIGIBLE.

The United States Navy's first dirigible balloon, the DN-1, has been shipped to the Naval Aeronautical Station, Pensacola, Florida, for final flying tests, the preliminary power plant and blower tests having been previously passed by the government inspector at the factory of the constructors, the Connecticut Aircraft Co., New Haven, Connecticut.

The DN-1 is of the non-rigid type, the gas bag maintaining its shape by the pressure of the contained gas, and the gondola being suspended by numerous ropes and cables fastened to the "belly-bands" of the bag.

The envelope of the bag is of double-ply rubberized cotton fabric; strength, 70 pounds per inch for both warp and weft; permeability, 35 cubic feet per 24 hours at two feet water pressure. All seams are extra wide, with double rows of stitching. The ballonets are made of double texture fabric; strength, 40 pounds for warp and weft.

All of the fabric, for both main envelope and ballonets, was furnished by the Cambridge factory of the United States Rubber Co., the shaping of the big bags and the setting-up of the balloon being done in the Naugatuck factory.

What the Rubber Chemists Are Doing.

VARIABILITY OF PLANTATION RUBBER IN TECHNICAL MIXINGS.

THE variability of plantation Para rubber, when vulcanized with various technical mixings in addition to sulphur, has been investigated by Eaton and Grantham, Agricultural Department, Federated Malay States. Their results appear in the "Journal of the Society of Chemical Industry," (October 31, 1916). In the experiments described by them zinc oxide, litharge and magnesium oxide with a small percentage of sulphur were used in several combinations. Vulcanization was effected in molds in a steam-jacketed vulcanizer at 140 degrees C. and tests made with ring specimens on the Schopper-Dalen testing machine.

Regarding the stability of their vulcanized samples kept six months or a year before testing, their experiments show that, with the 10 per cent sulphur mixing the rubber continues to vulcanize slowly during six months. This extra vulcanization represents about a quarter-hour cure at 140 degrees C. A certain amount of deterioration in tensile properties also takes place. While the 10 per cent mixing is excellent to ascertain variations in rate of vulcanization between different rubbers, especially when it is required to test the samples shortly after vulcanization, it is not a good mixing for testing the aging properties of different rubbers after vulcanization, because the large amount of free sulphur gradually exudes, leaving the sample porous and easily oxidizable. The authors append their paper with the following conclusions:

1. The variability of plantation Para rubber in respect to rate of cure continues to exist in various technical mixings in which the rubber is loaded with mineral constituents in addition to sulphur, and also in rubber-sulphur mixings containing different proportions of sulphur.
2. The variability is not of the same degree as with mixings containing 8 to 10 per cent sulphur.
3. The use of strong accelerating agents, such as oxide of lead, tends to obscure these differences which are produced in the raw rubber by the presence of a natural accelerator.
4. Other substances, caustic soda and potash and various organic nitrogenous accelerators, also obscure these differences, since these substances behave in a somewhat similar manner to the natural accelerators present in raw rubber.
5. To illustrate the differences in rate of cure between different rubbers, which is the most important variability in plantation Para "first latex" rubbers, and 8 or 10 per cent sulphur mixing, without other addition, is very satisfactory, although not suitable for stability or aging experiments.

SYNTHETIC RUBBER FROM ALCOHOL.

Ostromyslenski's method of producing erythrene rubber is given in "Chemical Abstracts," as follows: The mixed vapors of ethyl alcohol and air are passed through spirals of copper and silver gauze and the products are converted into erythrene by being passed in a gaseous or liquid state through a series of metal tubes containing aluminum oxide heated to 824 to 860 degrees F. Erythrene is converted into rubber in an autoclave containing a small quantity of a catalytic substance. In order to give the synthetic rubber all the properties of natural rubber it is necessary to add to it certain substances found in the latter. These additions amount to about 15 per cent and consist of pure nitrogenous substances, litharge and colophony, or Canada balsam, as a substitute for the resins of natural rubber.

In connection with the above it should be noted that Dr. Ivan Kondakorr, in a communication to "Le Caoutchouc & la Gutta-Percha" (November, 1916), refers to this synthesis as nothing new and to Ostromyslenski's recently published researches as a confirmation of previous knowledge rather than new discoveries.

VULCANIZATION TESTS.

Two reports made by the Imperial Institute to the Rubber Research Committee in Ceylon (Department of Agriculture Bulletin, Ceylon, No. 23), on vulcanization tests of plantation Para, deal with the following points: (1) The effect of different methods of coagulation. (2) The effect of adding ammonia, sodium bisulphite and formaldehyde to latex before coagulation. (3) The effect of the form of the rubber (sheet, crêpe, etc.)

TENSILE STRENGTH.

The maximum tensile strength of 64 specimens was 2,571 pounds, minimum, 1,607 pounds. Two samples of best fine hard Para gave, in comparison, 2,276 pounds and 2,312 pounds. Rubber prepared by spontaneous coagulation has tensile value equal to that coagulated by acids. Scrap rubber shows low tensile strength in every case. The use of different acids for coagulation has little effect on the tensile strength of the rubber produced. Double the usual amount of acid had no marked effect on the tensile strength. The addition of fractional percentages of ammonia, sodium bisulphite or formaldehyde to the latex before coagulation had no marked effect on the strength of the rubber. Hand-made and machine-made sheets seem to give rubbers of practically equal strength. Thick crêpe is slightly higher in tensile strength than thin crêpe.

ELONGATION.

The elongations at heating point ranged from 787 to 919 per cent. Two samples of best fine hard Para gave in comparison, 880 and 893 per cent.

TIME OF VULCANIZATION.

This was tested on a standard mixing of 90 parts rubber and 10 parts sulphur, vulcanized at a constant steam pressure of 50 pounds.

The results are thus summarized:

Hand-made sheet cured more quickly than machine-made. Crêpe cured more quickly than thin crêpe. Thin crêpe required longer to cure than the corresponding sheet.

Rubber prepared from the same sample of bulked latex by coagulation with different acids had approximately the same time of cure. When double the minimum amounts of acid were used, the time of cure was not much affected.

Addition of ammonia and sodium bisulphite to the latex before coagulation had no constant effect on the time of cure, but an excess of formaldehyde lengthened the time very considerably.

Differences in the tensile strengths of washed and unwashed rubber were comparatively small.

RUBBER OF UNIFORM COLOR

The production of rubber of uniform color has been specially studied by Clayton Beadle and Stevens and their results published in a paper presented at the Congress of Batavia. In brief they find that such rubber can be produced only by the exercise of special precautions in the coagulation of the latex. It is possible to obtain uniformly pale rubber if the latex is rapidly coagulated by an excess of acetic acid, the coagulum rapidly washed in a machine, followed by rapid drying in warm air or in a vacuum chamber. The reason for this is simple.

Rubber latex contains an enzyme, an oxydase which causes rapid absorption of oxygen from the air by the fresh coagulum. This oxygen reacts rapidly on certain organic substances contained in the latex, producing black coloring matters. Color is not an indication of quality, but manufacturers and dealers regard variations of color with suspicion. For this reason large dealers sort their cargoes and repack for external appearances, with no regard to the sources or origin of the rubber.

A method for obtaining rubber of uniform color, originally tried in Ceylon, consists in boiling the fresh coagulum, in pieces the size of one's fist, for 10 or 15 minutes in water. The heat destroys the enzyme and the rubber loses the property of blackening on exposure to the air. While the rubber is pale the boiling makes it sticky and more difficult to dry.

A third method consists in using small amounts of antiseptic substances to arrest the action of the enzyme. Among these, formaldehyde and bisulphite of sodium are commonly used. The percentages required are extremely small. After accomplishing their work they are removed from the rubber by washing in the crepeing machines.

Bisulphite of soda has no bleaching action on the rubber itself and is not able to destroy coloring material already formed. It simply prevents the action of the ferment. It is an antiseptic and not a bleaching agent. Vulcanization tests show that rubber prepared with an excess of acid is inferior to that prepared with the minimum of acid. The same is true of boiled rubber. Rubber treated with bisulphide loses nothing of its quality and is scarcely distinguishable from untreated rubber.

DECOLORING RUBBER

The influence of hydrosulphites on strongly colored crêpes has been studied by André Dubosc (Le Caoutchouc & la Gutta-Percha). The rubber was subjected to the action of sulfoxylate aldehyde of sodium, both hot and cold. Decoloration was more rapid under the former condition, especially in the presence of a small quantity of bisulphite of soda. Air dried, the samples do not remain absolutely white, but turn yellowish, although much paler than the initial color.

Sulfoxylates, and in general all the hydrosulphites, act on the coloring matter of rubber and by hydrogenation transform it into a leucobase, even if the coloration is old.

The accidental coloration, observed by Stevens and Clayton Beadle in the coagulation of latex, Dubosc concludes, can be more advantageously controlled by a hydrosulphite of sodium aldehyde or a sulfoxylate aldehyde.

STABILITY AND THE OPTIMUM CURE.

The views expressed by Dr. H. P. Stevens on the stability of vulcanized rubber and the "optimum" cure (THE INDIA RUBBER WORLD, October, 1916), are discussed adversely by Philip Schidrowitz and H. A. Goldsborough in "The India Rubber Journal" (October 28, 1916). They maintain the value and accuracy of their "correct" cure method of crude rubber valuation, as applied for technical purposes. With regard to "correct" or "optimum" cure in relation to aging, the authors state that the results of their experiments may be summarized as follows:

Standard mixture, 100 parts smoked rubber, 8 parts sulphur.
1. *Series stored over 15 months.* The samples most closely approximating to the "correct" cure showed less variation than the samples which were obviously under or over-cured, taking the "correct" cure tested 24 hours after vulcanizing as standard.

2. *Series stored over 8 months.* In three cases out of four a distinct improvement in "tensile product" was observed. None of the results indicate over-cure.

3. *Short period series.* Variation in the rest period between mixing and curing showed some, but relatively slight effect. The shorter the rest period, the slower the rate of cure.

Variation in the rest period between curing and testing exercises an appreciable effect on results during, approximately, the first 12 hours, but after that the alteration in properties is slow. The results are in keeping with practical experience on these points.

Investigation of the relation of combined sulphur to "correct" cure indicates that the former stands in no relation to mechanical properties.

"CORRECT" VS. "OPTIMUM" CURE.

The authors' original paper on the determination of "correct" cure will be found in "The Rubber Industry," 1914, page 214. In

brief their method is: (1) Vulcanization is physically and mechanically of a definitely progressive character. Its progress can be accurately expressed graphically by a series of stress-strain curves. (2) From the formula corresponding to the curves it is possible to select that curve, in a series, which represents an ideal balance of tensile properties. (3) The cure corresponding to such a curve is in fact the "perfect" or "correct" cure under given standard conditions of mixing, curing and testing. The method is scientific, admits of exact measurement, and is independent of any serious experimental error.

Eaton and Grantham's "optimum" cure is that cure which gives the highest figures for the "tensile product" (breaking strain and elongation at break). The method may yield erroneous results, mainly on account of the fact that on both sides of the "correct" cure, but particularly on the over-cured side, there is a region in which the "tensile product" may be equal to or greater than that of the "correct" cure. Since similar results may be obtained for a number of cures by this method, it may be impossible, in practice, to decide as to which cure, over a range perhaps of an hour or more, may actually represent the "optimum." The method gives no definite indication of the state of cure and is dependent on the uncertain character of the "break" and "elongation" figures.

RUBBER TESTING IN JAVA

The Central Rubber Station for the Netherlands Indies, at Buitenzorg, Java, in charge of Dr. O. de Vries, is equipped for research and testing purposes, especially for the study of rubber preparation methods and testing samples for control and improvement of work on the estates. The Bulletin of the Station is distributed by application to the director.

Dr. de Vries in a lecture before the Malang Planters' Association, at Malang, discussed the preparation of plantation rubber and the need for research, considering the relative position of the two principal forms, smoked sheet and crêpe. Generally, smoked sheet has a quicker rate of cure than crêpe. The tensile strength of smoked sheet need not be below that of crêpe, and it is often found to be higher, due to not overworking the coagulum as in the case of making crêpe. Smoked sheet is inferior to crêpe in the matter of uniformity, due to the method of preparation. Crêpe in Java is generally prepared on older estates, with a long experience and well-regulated routine, whereas sheet making is often undertaken on estates just starting manufacture and, in consequence, the product is not so carefully controlled. The preparation of crêpe is practically a mechanical process while the preparation of sheet is still often complicated by the large number of small pans and much hand making. There are also irregularities in drying and smoking, so that the method of preparation affords much more chance for variation. There can be no doubt, however, that it is possible to produce sheets of very uniform quality.

The excessive rise in price of acetic acid has stimulated research with other coagulating material. Sulphuric acid has been tried and it has been found that slight variations in the amount used have an appreciable influence on the quality of the rubber, notably on its rate of cure. Sugar as a coagulant, according to some experts, is likely to cause much variation in the rate of cure, owing to bacterial action in the latex, dependent on the weather during tapping.

EXTRACTING DEAD RUBBER LEAVES

Negative results were obtained by J. C. G. Vriens in the extraction with benzene of the dead leaves which were still on the *Hevea* trees before the normal leaf fall. [Chemical Abstracts.]

WHALE OIL AS AN ACCELERATOR

In referring to the suggested use, by Marill, of whale oil as a vulcanization accelerator, André Dubosc remarks in "Le Caoutchouc & la Gutta-Percha," that the crude oil containing sperma-

ceti is indicated, and adds that spermaceti contains a larger proportion of cholestrols, organic alcohols which are found in the unsaponifiable caoutchouc resins and which play an important part in vulcanization by aiding the change of the sulphur to hydrosulphuric acid. As pure whale oil is composed largely of oleine, margarine, cetine and phocenine, it is changed, during vulcanization, partly, at least, into rubber substitute.

CHEMICAL PATENTS.

THE UNITED STATES.

SHOE BOTTOM-FILLER. A plastic spreadable mass consisting of a gelatinous, adhesive cement binder having a resinous component and containing coagulated oil in a fragmentary condition. When molded into a thin layer in a shoe-bottom it sets quickly, forming a permanent, waterproof and highly resilient cushion, strongly adhesive and cohesive in character, and yielding freely in all directions to pressure without disturbing its cohesiveness. [Andrew Thoma, Cambridge, Massachusetts, assignor to the North American Chemical Co., a corporation of Maine. United States Patent No. 1,203,435.]

SELF-HEALING COMPOSITION. A composition for the inner tubes of tires, comprising reclaimed rubber, pine tar and palm oil, the mixture having a dense semi-plastic, semi-elastic, tacky consistency free of pores and retaining these properties when heated in contact with rubber containing sulphur. [James P. Claire, Stratham, New Hampshire. United States patent No. 1,206,414.]

PROTECTIVE COATING. A composition consisting of liquid gutta-percha, 20 per cent; benzine, 15 per cent; ether, 25 per cent; rye flour, 20 per cent, and plumbago, 20 per cent. [Walter Schermerhorn, Omaha, Nebraska. United States patent No. 1,204,97.]

THE DOMINION OF CANADA.

WATER-ROOFING COMPOSITION. A composition of grease, wax and rubber. [Joshua D. Trenaman, Hamilton, Ontario, Canada. Canadian patent No. 171,770.]

THE UNITED KINGDOM.

TREATMENT OF LATEX AND RAW OR SMOKE RUBBER. The removal of proteins and soft resins is effected by treatment, without heating, with mixed solvents, alcohols and any form of oil spirit, such as benzine or naphtha. The solvents may be applied as a vapor or spray in a specified apparatus. The precipitated rubber rises and is separated. The benzine which is absorbed by the rubber dissolves the soft resins and soluble proteins, but scarcely affects the hard resins and insoluble proteins which it is desired to retain. During the crepeing most of the dissolved resins and proteins are expressed. About 5 to 10 per cent of benzine remains in the rubber. [C. A. Icken, British patent No. 8,487 (1915).]

SUBSTITUTES FOR EBONITE AND HORN. Treatment of yeast with formaldehyde or other aldehyde. As an example, 1,000 parts of yeast pulp containing 15 per cent of dry substance are mixed with an aqueous solution of 20 parts of blood albumen and coagulated by boiling. The precipitate is mixed with 175 parts of a 40 per cent solution of formaldehyde. The mixture is dried and mixed with 10 parts of powdered glue, to which may be added 75 parts of colophony and 8 parts of celluloid. The mixture is dried and molded at a temperature above 95 degrees C. and a pressure above 150 atmospheres. [H. Blucher, 31 Hardenberg strasse, Leipzig, and E. Krause, E. 6 Sedan strasse, Steglitz, near Berlin, Germany. British patent No. 11,563 (1915).]

GOLF BALLS. Gutta-percha, rubber or other material, with center or layers incorporated of a radioactive substance, such as pitch blend, etc. [E. Miller, E., 167 Oxford street, London. British patent No. 11,509 (1915).]

INDIA RUBBER. Latex is coagulated by treatment with the gases from the destructive distillation of wood after removal of the tar from the gases. [E. C. R. Marks, 57 Lincoln's Inn Fields, London. British patent No. 11,615 (1915).]

LABORATORY APPARATUS.

FREAS ELECTRIC OVENS—IMPROVED.

TWO new types of Freas electric ovens are now available. One is designed for drying a large number of samples simultaneously, or samples containing considerable moisture. It is provided with a flue in the back wall above which is placed a centrifugal fan driven by a motor supported on the outside of the oven. This arrangement provides forced circulation of heated air, and a forced withdrawal of moisture-laden air, thereby creating more perfect conditions and shortening the time required for drying. Another type is fitted with a cast aluminum perforated plate, which is revolved in the oven chamber by means of a motor. This arrangement subjects the various samples to be tested (which are placed on the revolving shelf) to the same constant temperature. [Eimer & Amend, New York City.]

FILTER PAPERS.

The short supply of German filter papers for analytical work has brought out a series of a dozen Whatman grades of this stock of English manufacture, which are taking the place of the well-known Schleicher and Schnell filter papers. All of the Whatman grades are guaranteed free of starch and chlorine and are put up in sealed boxes. [Eimer & Amend, New York City.]

TABLE TOPS.

A very practical top for laboratory tables that has been in use for the past five years at Dakota Wesleyan College, is described by H. I. Jones in the "Journal of Industrial and Engineering Chemistry." It consists of ordinary soft pine flooring on which are laid two sheets of tar paper, covered with large sheets of asbestos slate one-eighth inch in thickness. The asbestos is screwed on, the holes being countersunk and filled above the screw head with asbestos cement. Every year the table tops are treated with a gasolene solution of paraffin sufficiently concentrated to set to a jelly consistency when cold. The solution is brushed on hot. This paraffin treatment gives a polish but is really unnecessary and adds nothing to the serviceability. This style of top has the advantages of low first cost, long life, and ready application by anyone. It is so poor a conductor of heat that even thick glass containing hot liquids may be set upon it without breaking.

IMPROVED TEST TUBE AND FLASK BRUSH

An improvement on the familiar sponge-end bristle test-tube cleaner is found in the "Dolbey," a patented brush of long fiber which fills and cleans thoroughly the inner surfaces of test-tubes and flasks. [Edward P. Dolbey & Co., Philadelphia, Pa.]

GOGGLES FOR FACTORY USE.

Rubber makers regularly engaged in buffing vulcanized rubber might profitably use the style of protective goggle described by J. R. de la Torre Bueno, of the General Chemical Co., in the "Journal of Industrial and Engineering Chemistry." His suggestion for the ideal goggle provides for, (1) perfect protection for the eye, (2) large field of vision, (3) comfort. The frame or mask should be of flexible wire netting with flexible edges bound with soft rubber tubing to conform to the facial contours. The glasses should be large and held in well-ventilated rubber settings to prevent condensation of moisture and clouding.

According to the military correspondent of the "Berliner Anzeiger," Berlin, Germany, the booty taken by General von Falkenhayn's forces at Crajova comprised oil, benzine and rubber in quantities that exceeded expectations.

New Machines and Appliances.

THE SCOTT AUTOGRAPHIC TESTING MACHINE.

THE natural advancement in the manufacture of textiles and mechanical rubber goods has required a more thorough knowledge of the materials used and of the effects of various processes through which these materials pass in the course of manufacture. Especially is this true in the manufacture of tires, as the success and life of a tire is by no means determined by its initial strength, but quite as much by its ability to retain its strength and resiliency.

The testing machine plays a very important part in determining the materials best suited for the desired results. In fact, the success that has been attained by manufacturers who have used the tensile strength tester intelligently has led them to further efforts along this line until the manufacturer of the testing machine has been called upon to produce a tester that will meet the most exacting requirements.

The accompanying cut shows one of the latest models that will automatically test rubber, tire fabric or other materials and write the result upon a standard letter-head. It will make tensile, elasticity, friction and other types of tests in general use.

It is mounted upon two heavy iron rail frames and is designed to be fastened to the wall in a vertical position. It can be

driven by an electric motor insuring constant speed and uniform results. The draw bar, or stretching screw, is of special high-carbon steel $1\frac{1}{8}$ -inch diameter and has a movement of 48 inches. It is operated by a heavy bronze nut and passes through the gear box without revolving. The downward or stretching stroke is made by direct gearing, allowing no chance for slip or speed variation. An automatic reverse brings the moving clamp back at high speed.

The speed of stretch may be varied by a back gear arrangement to reduce from 20 to 2 inches per minute. This provides for "friction" tests on hose, belting packing, boot tops, etc.

The autographic charting device works automatically and may be used to chart both stretch and strength tests, and by pressing a button on the side of the recorder it will produce a magnified or enlarged chart of "friction" tests. All charts are developed on standard letter paper held flat by two rubber rollers. The line is drawn by red ink from a pen operating across the sheet as the platen moves downward in ratio with the movement of the stretching screw. Several tests may be recorded on the same sheet and comparisons made of various samples. The sheet can then be placed in a typewriter for further data or filed in the usual way.

Rubber and fabric clamps, as well as spools with cleats for holding cords, etc., are furnished and are quickly interchangeable. An elasticity measuring device is attached to the frame of the machine and the length of stroke and distance between clamps may be varied by adjustment collars on the vertical con-

trol rod. When once set the machine will automatically stop and reverse at the same position with every test.

The recording head is simply but strongly built and has no delicate parts to get out of order. Its accuracy may be proven at any time without the use of special mechanism. The dial is of white celluloid with black figures and can be easily kept clean. The pointer indicates the maximum pull required to break the sample and remains in this position until reset by the operator. This is accomplished by means of a novel device requiring very little effort. [Henry L. Scott & Co., Providence, Rhode Island.]

THE SQUIRES BATHING CAP MACHINE.

That bathing caps are becoming more popular each season is demonstrated by the increasing demand for them. In an article on bathing cap machines that appeared in *THE INDIA RUBBER WORLD*, April 1, 1916, was shown a sketch of a machine for plaiting and forming bathing caps.

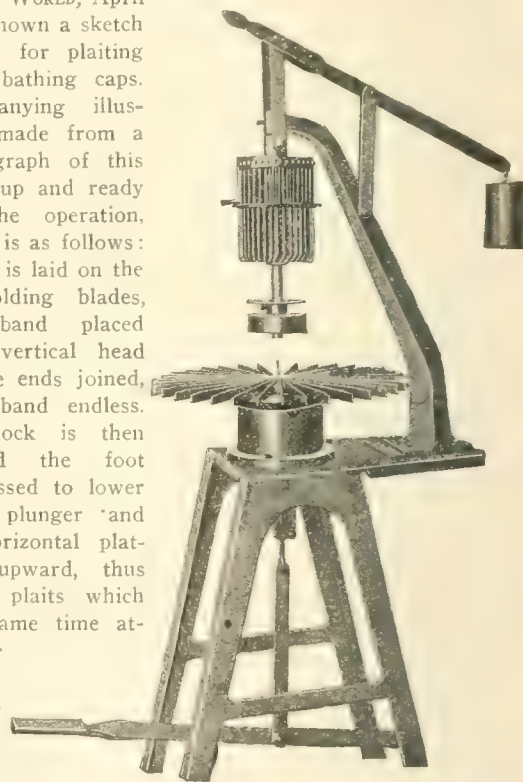
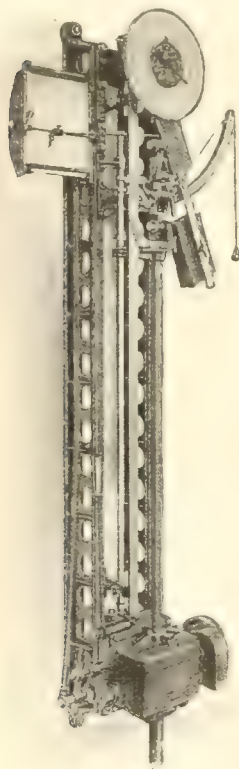
The accompanying illustration was made from a recent photograph of this machine, set up and ready for use. The operation, briefly stated, is as follows: The cap body is laid on the horizontal folding blades, the head band placed around the vertical head block and the ends joined, making the band endless. The head block is then lowered and the foot treadle depressed to lower the hollow plunger and force the horizontal plating blades upward, thus forming the plaits which are at the same time attached to the head band.

The treadle is then released, allowing the horizontal

blades to resume their original position. The cap now being folded over the blades of the vertical head block, a ring, to which the blades are attached, is moved to the right, which folds the plaits one upon the other. After attaching this outside head band and trimming, the cap is then removed from the machine. It is claimed that an operator of ordinary intelligence can make one complete bathing cap a minute on this machine. [The S. & W. Rubber Manufacturing Corporation, College Point, New York.]

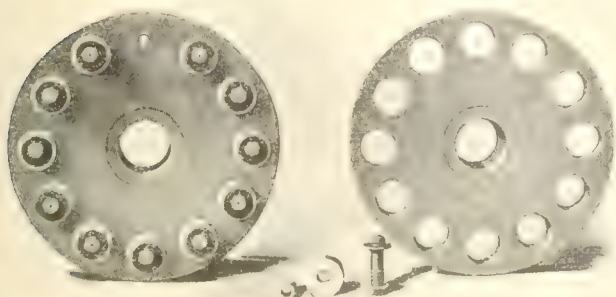
THE FAWCUS FLEXIBLE COUPLING.

The unusual strains and sudden shocks to which rubber mill lines are subjected, frequently result in broken gearings, fractured shafts and damaged bearings. For that reason a flexible coupling that will absorb shocks and permit a certain amount of shaft misalignment is considered a necessary part of the mill room equipment. The pinion shaft of a double helical gear drive should, moreover, be connected to the driving shaft by a



balanced flexible coupling that will allow an adequate amount of free axial movement between the two parts of the coupling.

The illustration shows the Fawcus coupling that is designed to meet the particular requirements of rubber mills and mill drives.



It consists of two flanged castings machined all over, one carrying steel pins and the other having rubber-bushed holes into which the pins slide freely. The bushings are made of pure compound and bushed with brass.

These couplings are made of cast iron or steel, in ten sizes, constructed to transmit with safety the required horse-power. [Fawcus Machine Co., Pittsburgh, Pennsylvania.]

THE LUMMUS CAUSTIC SODA DISSOLVER

Most concerns interested in recovering rubber by the alkali process continue to dissolve caustic soda in the old-fashioned way, despite all the disagreeable inconveniences and dangerous work of breaking up the cakes, handling and stirring them in some suitable receptacle to which steam is piped for heating water. Not only can these troublesome operations be avoided, but practically the entire cost of making the stock solutions of

caustic soda may be eliminated by the use of the automatic caustic soda dissolver, illustrated herewith. This was devised by the superintendent of a chemical works who appreciated the fact that his men were often laid off for a day or so because of caustic soda burns.

This dissolver operates without steam for heating the water or power for stirring. Solution is effected by taking advantage of certain properties of solutes, accomplishing the desired result more quickly than is

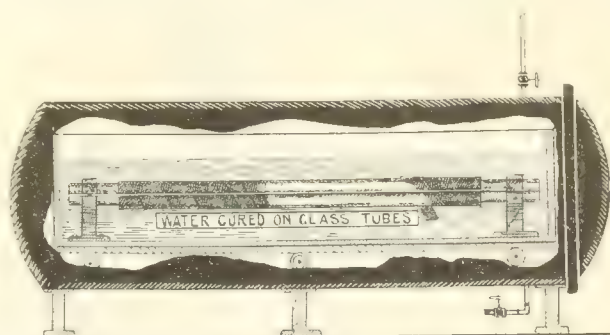
possible even with the use of hot water in the old method. The operation of the dissolver is exceedingly simple. The thin iron drums are stripped from one or more cakes of the fused caustic, which are then rolled without breaking on the grid of the hopper. The dissolver is then filled with cold water to within a few inches of the curb and the safety doors are inclined against the cakes so that they

will close as the cakes melt down. The balance of the operation proceeds automatically, without further attention. The strength of solution can be controlled by a device in connection with the circulating system which may also be adjusted to suit individual requirements. This device has been on the Boston market for several years, but has not become generally known. It is claimed to be a money saver, and it gives the works manager assurance that the stock solution will be ready at a regular time each day. [The Walter E. Lummus Co., Boston, Massachusetts.]

INNER TUBES MADE ON GLASS POLES AND WATER CURED.

In ordinary practice, an inner tube is built up by wrapping a sheet of rubber stock around a mandrel, which is then placed in a horizontal vulcanizer and cured in open steam. What is said to be an improvement on this method, in that it produces smoother tubes, consists in covering the mandrels with hard rubber and vulcanizing in hot water. A variation of this is the use of glass mandrels.

The hot-water process, while not a novelty, has advantages in the manufacture of certain goods, particularly inner tubes,



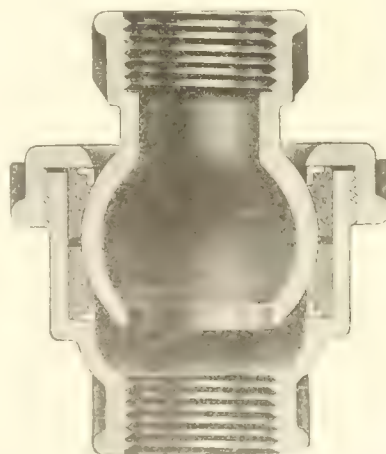
where a soft, smooth finish is desired. Moreover, water curing is a non-burning process.

According to the S. & W. method illustrated here, the stock is built up on glass poles and instead of the usual cloth wrapping, the tubes are covered with a seamless circular woven cotton jacket. The poles are then placed in a suitable tank mounted on a truck, which is rolled into an ordinary horizontal vulcanizer. The tank is filled with cold water, the vulcanizer head closed and live steam turned into the heater until the cure is completed.

THE BARCO FLEXIBLE JOINT.

Vulcanizing presses of the single or multiple platen types are all dependent upon swing joints or some type of universal connection in the steam supply line. Moreover, there are many

other rubber machines that are operated by compressed air or hydraulic pressure where flexible connections are necessary. A flexible joint that will permit movement of the adjacent parts and at the same time remain tight under steam or air or water pressure is interesting.



The joint here illustrated may be used wherever steam, air, oil, water, gasoline, and other liquids are to be conveyed through a flexible or movable connection. It is particularly appreciated in manufacturing operations where the service is severe and where interruption in the use of the machine through defective connections is a serious matter.

The joint consists of a ball set in a casing and surrounded by two non-metallic hard gaskets, which contact both with the ball and casing, and allow the ball to move in an angular or rotary movement, while the two gaskets are held in place by a locking nut. The whole construction is very simple and the great success of the joints is due to the application of the gaskets to the ball, and the material of which these gaskets are made.

The joints are made in a large variety of sizes and shapes and they can be applied to almost any condition arising in the manufacture of rubber goods. [Barco Brass & Joint Co., Chicago, Illinois.]

THE SQUIRES BUCKET-TYPE STEAM TRAP

In conjunction with vulcanizing presses for mold work, the bucket-type steam trap is generally recommended. If the steam pressure is the same for each press, it will be possible to operate several presses on one trap of suitable size, but five presses operating at 80 pounds and at 60 pounds, for instance, would require a separate trap for each group. Sometimes the trap valve is opened or closed to increase or decrease the circulation speed and in this instance an individual trap is preferable.

The accompanying illustration is a sectional view of a well known type of the bucket steam trap. It has one inlet, two outlets and two blow-off connections. The pipe connections can be made on either side, whichever may be most convenient, leaving the other side plugged. After installing the trap there should be enough water in it to float the bucket, as the valve does not seat until the bucket is up. As soon as sufficient water enters the trap, the bucket, being buoyant, rises and closes the valve, which is attached to it by the valve stem. When condensation in the trap body has reached the high-water line the bucket fills and sinks, opening the valve which discharges the water in the bucket, leaving enough to insure a perfect water seal, together with the condensation in the trap body through the valve port to the outlet until it has reached the low-water line.

Much difficulty may be avoided by giving steam traps due attention; for instance, blow out the trap as often as the condition of the water makes it necessary. If the trap becomes clogged with mud, caused by the boilers priming, the plug on one of the blow-off connections may be removed and the settling chamber cleaned out with a rod, without disconnecting the piping. [The C. E. Squires Co., Cleveland, Ohio.]

MACHINERY PATENTS.

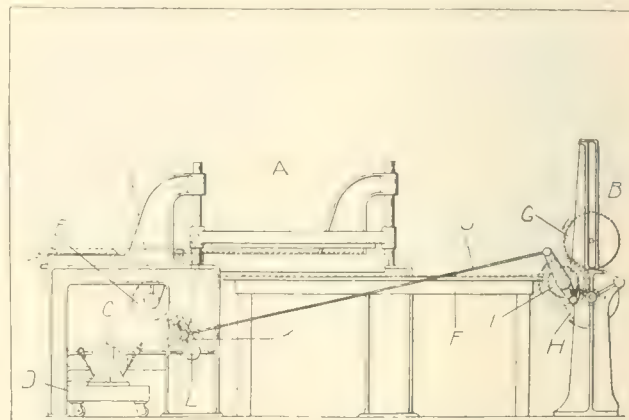
THE STEVENS BIAS CUTTER TAKE-UP.

THE inexpensive and tedious operation of removing strips of frictioned fabric from the bias cutter and placing them in "books" is entirely obviated by this machine. A traveling liner is provided upon which the strips fall, and which is wound up with them in a compact roll.

In the drawing, *A* represents a bias cutter of the ordinary type and *B* the take-up device. The liner roll *C* is mounted on a truck *D* that may be rolled out and a new liner roll replaced. From the

roll the liner passes up over an idle roller *E* and then under the cutter and over the table *F*. This table is long enough to accommodate several strips of fabric for inspection or measurement prior to being rolled up.

The wind-up machine comprises two standards, provided with vertical slots or guides for the journals of the take-up roller *G*.

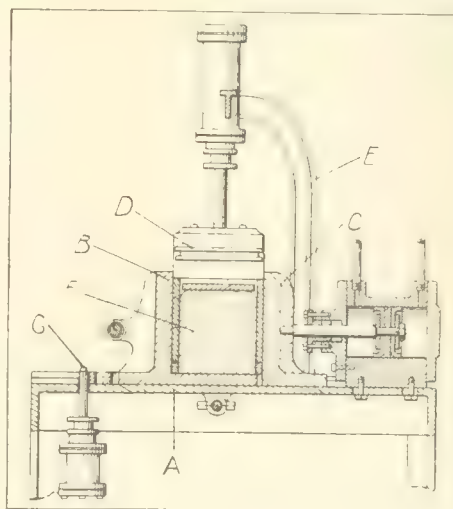


Directly below the roller is a drum *H*, the surface of which is roughened and drives the take-up roller by contact. The drum is rotated intermittently by gearing and a pawl and ratchet wheel movement shown at *I* and actuated by rod *J*, attached to crank arm *K*, which is driven from the main shaft *L*. In operation, the bias strips as they are cut off fall on the liner strip and are carried to the rear of the machine where they are rolled up with the liner on the wind-up roller. [William C. Stevens, assignor to the Firestone Tire & Rubber Co.—both of Akron, Ohio. Canadian patent No. 169,455 (1916).]

MACHINE FOR MAKING STORAGE BATTERY JARS.

This machine makes seamless storage battery jars with reinforced corners from sheets of uncured rubber. The drawing is a vertical section through the center of the machine, which is

supported on suitable legs not shown. The bed *A* supports the four horizontally movable rams, only two of which, *B* and *C*, are shown. These are operated by compressed air with the exception of *B*, which is hand operated. The vertical ram *D*, also air operated, is supported with its cylinder by a yoke frame *E* that is bolted to the bed.



In operation, the sheets of stock which are cut to size and covered with thin sheets of tin, are applied to the mandrel *F*, which is placed on the tongue projecting from the hand-operated ram *B*. This is moved forward under the vertical ram where it is held in position by the air-operated locking pin *G*. The air valve is now operated, advancing the rear ram, then the two side rams and finally the upper ram, thereby molding the sheets of stock on the core and forming a jar without seams or joints.

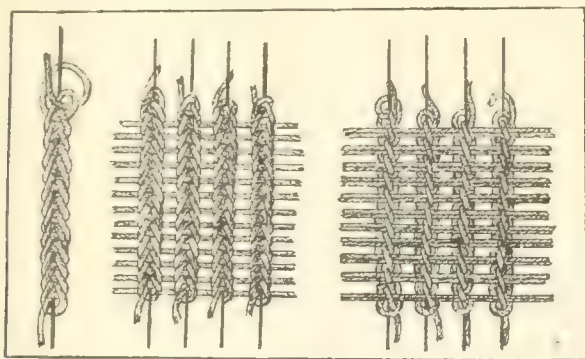
The air valve is then reversed, which withdraws the locking pin and retracts the several rams, when the mandrel and jar

PROCESS PATENTS.

ELASTIC FABRIC AND PROCESS FOR ITS MANUFACTURE. In manufacturing elastic fabrics for use in making suspenders, masks for protection against asphyxiating gas, etc., the rubber threads are dressed, that is, tightly enclosed in a sheath of fabric. This holds the rubber while it is stretched, in the course of manufacture, and prevents it from relaxing totally, the object being to give nerve to the rubber.

In the new process, however, the rubber threads are dressed at the same time the fabric is woven, thus saving the preliminary operation of dressing the rubber threads.

It consists in forming, with a textile thread, a small chain on a rubber thread, which constitutes the core of the chain. If the rubber thread is more or less stretched during this operation it will have more or less nerve and if several of the chains are disposed side by side, and connected by one or more weft threads, the result will be a fabric that is lengthwise elastic.



The little chain is shown in the drawing on the left and is made on a passementerie loom of the needle or chainette type. The rubber threads coming from a bobbin pass through holes placed equally distant from one another in a guide-bar in front of the loom. The bar is arranged above the needles and the rubber threads running through it are separated from one another by the distance or interval between two consecutive needles. The rubber threads are placed between each needle and the guide-bar and are animated with an even, to and fro movement, which is adjusted so that each rubber thread passes alternately after the formation of a link, to the right and to the left of the corresponding needle. The result is, the chain is formed around each rubber thread and the weft joining the chains to one another goes through each of the links of the little chain.

As each little chain is made up of three strands, the weft threads, passing through the chain, leave two strands on one side and one on the other side and, after shrinkage, the fabric would be unbalanced. To correct this, a weft thread is passed on each side of the rubber thread, single weft on the side where there are two strands, and double weft on the side on which the strands of the little chains are single.

Thus in the center drawing will be seen the face of the fabric with two strands and one warp, while the reverse side with single strands and double warp is shown on the right. [Louis Brun. French Patent No. 480,735 (1916).]

VENTILATED RUBBER GLOVE. Flutes or air passages are molded in the glove, extending along the backs of the fingers and thumb to points beyond the wrist. [John C. Gibson, Akron, Ohio. United States patent No. 1,206,102.]

OTHER PROCESS PATENTS.

THE UNITED STATES.

- 1,204,609. Dental rubber composition and art of manufacture. S. G. Supple, East Orange, N. J., and C. J. R. Frostrom, Los Angeles, Calif.
1,204,816. Beltline composed of wire, rods, non-metallic pins, and a rubber sheath enclosing the rods and pins. E. Pattee, Santa Cruz, Calif.

- 1,204,976. Process for constructing endless belts and molds therefor. F. Hall, Newark, Ohio.
1,206,914. Process of manufacturing rubber boots. R. B. Price, New York City, assignor to Rubber Regenerating Co., Mishawaka, Ind.
1,206,920. Plastic composition comprising a mass of rubber and a multitude of short untwisted textile fibers. J. R. Sabford, Salisbury, Conn.
1,207,293. Process of fitting hard rubber jars to storage battery boxes. C. Hodge, Radnor, Pa.
1,207,294. Method of repairing tire casings of the clincher type. O. F. Hungerford, assignor of one-fourth to C. E. Crookston—both of Middleville, and three-fourths to B. M. Soule, Grand Rapids—both in Michigan.
1,207,372. Process of making rubber water bottles. M. B. Clarke, Canton, Ohio.
1,207,709. Fabric for tires. L. J. Campbell, Chicago, Ill.

THE UNITED KINGDOM.

- 11,229 (1915). Shoe soles. T. C. Redfern, Dawson and Springbank streets, Hyde, Cheshire.

MISCELLANEOUS PATENTS.

A SECTIONAL RIM. Briefly, this comprises an annular base rim with side flanges; two flange rings adapted to co-act with a clincher or straight-side tire; a movable wedge-shaped key piece held in place by a spring latch. [Ernest Hopkinson, East Orange, New Jersey. United States patent No. 1,204,019.]

INTERNAL TIRE PUMP. For maintaining tire pressure a block of soft vulcanized rubber with molded air chamber, air passages and valves is placed between the inner tube and casing, and cemented to the former. The depression of the tire casing and the resiliency of the rubber block jointly pump air into the tire. [Henry F. Molkenbur, St. Paul, Minnesota. United States patent No. 1,207,427.]

CONTAINERS FOR TIRE REPAIR MATERIALS.

Auto-repair kits have grown in popularity of late, as the majority of motorists do their own tire repairing; moreover, in the tool box of many cars will be found the little paper screw top can containing a blow-out patch, rubber cement and cold patches for emergency purposes.

Large quantities of these screw top paper cans and tubes are used by manufacturers of repair materials to contain cementless patches, frictioned and coated fabric, unvulcanized tread and tube stock, combination tube stock for inside use and vulcanized pure gum patching sheet for general purposes. Talc for dusting the inner surfaces of casings before inserting the tube, is usually



sold in these containers. They are made in many different sizes to hold combinations of standard supplies and containers for specially equipped tire repair kits are made to order. [The St. Louis Paper Can & Tube Co., St. Louis, Missouri.]

NO MOTOR ROADS IN AMERICA!

Explaining the enormous United States consumption of rubber, "Le Grand Livre Commercial et Industriel," November 5, 1916, says:

The enormous consumption of rubber in the United States amounts almost to two-thirds of the world's production. This is due to the great consumption of pneumatic tires in the United States. There, there are hardly any wagon roads. All is rail-ways and rivers. The roads are bad, and, frequently, are nothing more than trails. The wearing out of tires is, therefore, formidable. But what do the Americans care, if they can cover kilometers. On another hand, the cheap automobile has generalized the use of motor cars, hence, a number of automobiles that we don't know in our old Europe.

New Goods and Specialties.

STAMP PAD WITH MOLDED RUBBER BASE.

TO relieve the stress, and strain of modern business life rubber heels, rubber casters, and many other noise-eliminating and jar-reducing devices in rubber have long ago entered upon enduring popularity. A recent and welcome addition is the stamp pad with molded rubber base—solid, substantial and absolutely noiseless. The base of the one here



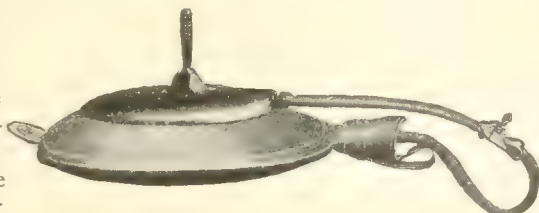
illustrated is of gray rubber, the straight-cut edges extending well beyond the ink pad and thoroughly protecting the furniture upon which it is placed. The cover is of the usual metal variety, painted in yellow with black

lettering, and fastened to the rubber projections at the back of the pad by a small revolving rod.

It is stated that the ink used in this pad is prepared from a new formula which gives non-blurring, quick-drying, perfect impressions. [The Superior Type Co., Chicago, Illinois.]

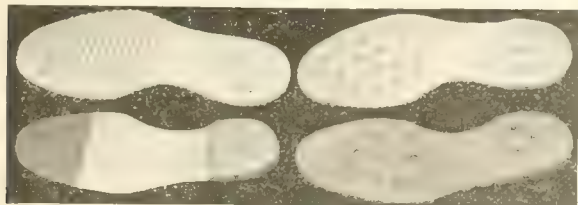
SWEET'S COLON BATH.

It is generally understood that a large majority of human ills originate in diseases of the colon, or large intestine, and that judicious internal bathing is a safer and more efficacious method of dealing with these troubles than by the use of drugs. The combination internal bath, fountain syringe and hot-water bottle here illustrated has, besides the usual rubber water bottle and tube, a portable hard rubber pad containing an oil chamber. It is claimed that this is the only internal bath on the market in which oil can be used. [Sweet's Colon Bath Co., Chicago, Illinois.]



ALL-WEATHER TREADS IN SOLES.

Now that rubber soles are used extensively by shoe manufacturers, the anti-skid proposition is being studied and many designs of both soles and heels are now shown with treads intended to prevent slipping as far as possible. The four soles illustrated here are among the latest. The two on the right show adaptations of the vacuum principle, while the upper one



on the left has a series of straight, somewhat diagonal ridges, which answer for this purpose. The lower one on the left is composed of two different compounds neatly joined together, allowing for greater wear where it is most needed. [Avon Sole Co., Avon, Massachusetts.]

THE "CAMP-MOBILE."

Ever since the coming of the automobile, camping accessories have grown in volume and variety, and for some time it has been no uncommon thing for motoring parties to carry with them complete camping outfits, affording a vacation freedom for the conventional house-dweller undreamt of in former years.



The "Camp-Mobile" here illustrated, which can be folded up into a compact closed trailer and attached to the rear of an automobile, contains the latest

improvements in camp comfort, convenience and utility. It will be seen that, unlike many tent arrangements for this purpose, it has a solid canopy deck in the top, made of hardwood frame slats. This is covered with heavy, rubber-coated material, affording a rigid and absolutely weatherproof overhead protection. The side covering is of double-filled khaki and closely woven waterproof duck, with screen ventilators. The wheels are of hickory, painted a dark green, with solid rubber tires. The body of the trailer is 3 feet 8 inches by 6 feet

8 inches, of cabinet - made type, with hardwood sills, wrought iron braces, tongue and groove dust-proof floor. The equipment consists of two double spring beds 47 inches wide and two regular bed mattresses; a collapsible table, two-burner gasolene stove, two-compartment ice box, lockers and shelves, the net weight of the outfit being about 600 pounds.



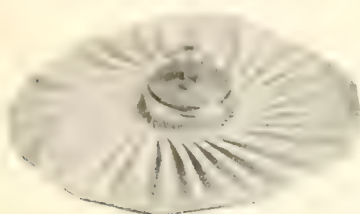
By removing all camping equipment and attachments, the "Camp-Mobile" may be converted into a commercial trailer, with or without top. Thus its possession may prove a business asset as well as a recreation adjunct. [Cozy Camp & Auto Trailer Co., Indianapolis, Indiana.]

RUBBER-COATED ELASTIC FABRIC.

That elastic fabric cannot be kept indefinitely in stock without deterioration is a well-known fact, for which either the merchant or the buyer frequently has to suffer. This difficulty has been successfully met by a new process in which the usual elastic webbing is coated with rubber, as it were, sealing the fabric, rendering it impervious to the effects of the atmosphere, and consequently prolonging its usefulness. This rubber coating may be applied to all kinds and widths of elastic webbing and is therefore suitable for all the various articles in which webbing is utilized. It can be cleansed readily with a sponge, and it is claimed that if applied to webbing that has already lost its snap through rotting of the threads, this rubber coating will give it a new lease of life. [S. & W. Rubber Manufacturing Co., College Point, New York.]

ALLINONE COMBINATION HOT WATER AND ICE BAG.

In nearly every form of illness either hot or cold applications are beneficial, and by the prompt relief thus afforded many lives are saved while awaiting the physician's arrival. The rubber

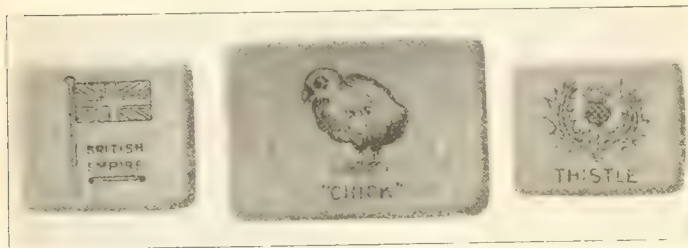


bag shown herewith may be used to contain either ice or hot water and is said to have unusually satisfactory properties for both purposes, holding heat longer for the hot applications, and not perspiring, as do some, when used as an

ice-bag. Also, the "Allinone" is claimed to be absolutely airtight, withstanding the most severe tests of continual sterilization, and being unaffected by steam under pressure, acids, benzene, alkali, saline solutions and other chemicals. It is extremely light in weight, yet durable, and so flexible that it will shape itself to any part of the body. [Simon Kaufman Co., Inc., Philadelphia, Pennsylvania.]

NORTH BRITISH PRODUCTS.

At first thought it would seem that rubber erasers offer slight opportunity for variety, but by the use of trade names, designs, and different colors and shapes, a diversity is obtained which



affords a large scope for sales. Many of these erasers are used by school children, to whom the rubber with a picture, or a name, or a pretty color especially appeals, but they are excellent for general use and there is a surprising number of adults who purchase more readily an article of any character with a distinctive mark of some sort.

The British flag and the words "British Empire" form the patriotic scheme of decoration for a pencil eraser in white rubber, shown herewith, which is designed for ordinary school and office use. The "Chick" brand has a velvety softness of texture and is especially adapted for cleaning large surfaces and for working on paper of delicate texture. The imprint also appeals to the juvenile purchaser, and this eraser is supplied in red, white and green. The well-known "Thistle" trade-mark of the manufacturer adorns the third eraser shown



in the illustration, which comes in an artistic shade of pale gray.

Then there are the "Peter Pan" erasers, in exceptionally attractive shades of brown and blue; the "Perfection," "Unity,"

"Atlas"; the "Draughtsman," a specially soft rubber for drawing office use; the "Racer," showing a horse's head; and the "Palette," with a design of an artist's palette and brushes, furnished in red and white, and particularly suitable for artists' use.

A popular raincoat made by the same company is also shown. This coat is built on severely simple lines that give a well-tailored effect. [The North British Rubber Co., Limited, Edinburgh, Scotland.]

WIND-SHIELD CURTAIN FOR FORD CARS.

A simple accessory which adds considerably to the comfort of automobile driving is shown in this combined wind-shield



and top curtain for Ford cars. It is made of heavy, rubber-coated auto-cloth and consists of a curtain which closes the space between the wind-shield proper and the top of the car, affording complete protection from wind and storms. This curtain is arranged to fasten along the front edge of the top and is very easy to attach. [Nathan

Novelty Manufacturing Co., New York City.]

"KLINGERIT" TYPE COMPRESSED ASBESTOS SHEET PACKING.

After the European war was declared, the great American demand for this product, manufactured exclusively in Germany, Austria and England, could no longer be met. Imports ceased and the supply in this country was soon exhausted. Appreciating the opportunity thus afforded, a Connecticut firm manufacturing similar goods began to experiment along this line and is now producing at the rate of 1,000,000 pounds yearly, a compressed asbestos sheet packing that meets every service requirement and stands up under the most rigid tests. [Royal Equipment Co., Bridgeport, Connecticut.]

"BUCKLE-ON" BLOW-OUT PATCH.

For remedying tire blow-outs, there are patches and patches. Many combine the virtue of durability with the objectionable feature of a thickness which causes an unpleasant bump at every revolution of the tire. It is claimed that in the blow-out patch here illustrated, exceptionally strong, tightly-woven fabric and tough tread rubber take the place of inconvenient thickness and



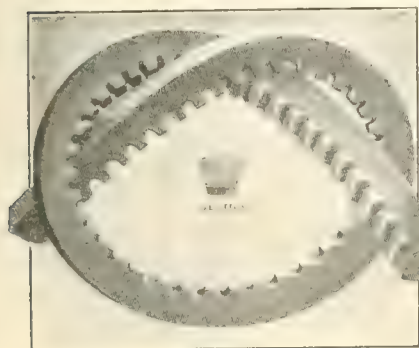
maintain the smooth riding qualities of the unpatched tire. Also, it cannot creep and expose the hole intended to be covered because the buckle straps which fasten it on are wrapped around the spokes of the wheel and hold the patch firmly. This handy accessory is supplied in 3-3½, 4-4½ and 5-5½-inch sizes, so that one patch fits two sizes of tires. [The Goodyear Tire & Rubber Co., Akron, Ohio.]

BRITISH MOTORCYCLE BELTS.

RUBBER V-shaped motorcycle belts, now almost entirely unknown in America, are very popular in Europe, especially in Great Britain, where they are used, almost to the exclusion of all other mediums of power transmission, on two-wheeled motor vehicles. The reason advanced by those conversant with the subject is that American motorcycle manufacturers do not

appreciate the real advantages of this flexible and efficient drive.

Early American motorcycles were provided with belts of both the flat and V-shaped types. When flat belts were used, it was almost impossible, owing to limited space, to fit belts of sufficient width for transmitting the power from the engine to the rear wheel without considerable slipping, which caused the belt to wear out rapidly.



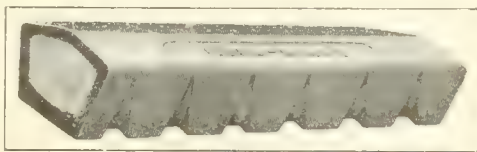
THE NORTH BRITISH CLINCHER FLEXIS BELT.

Trapezoidal, or V-shaped belts, were but little more successful because, in all cases, either the driving pulley or the belt used was too small for the horse power to be transmitted. Both flat and V-shaped belts gave way to chain drive before their use was sufficiently well understood to demonstrate their value for motorcycle power transmission, and the feeling is still strong among many American motorcycle men that they are not practical for our heavy, high-powered machines.

In Europe, correct designing has perpetuated rubber motorcycle belts, which are claimed to be

more flexible, easier on the machine, tires and rider, and just as efficient under usual conditions as chain transmission.

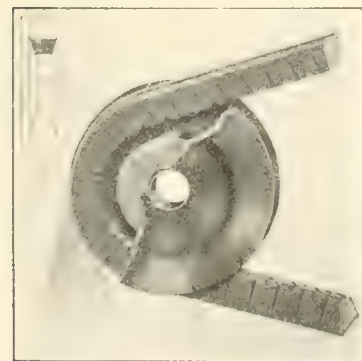
Here are some well-designed types of belts made in Great Britain of rubber and canvas and embodying important features. In these every factor in running conditions appears to have been studied closely by practical motorcyclists as well as engineers. The grooves absorb the natural displacement of rubber when the



THE WOOD-MILNE BELT.

belt is bent to negotiate the small driving pulley. Without these grooves the belt, when so bent, would widen at its base so that the top half would be forced away from perfect contact with the pulley.

The fabric of motorcycle belts must be of the best quality of cotton, proofed with rubber and embedded in a tough and wear-resisting rubber compound. Belts must be designed and constructed to insure a minimum of stretch.



THE AVON WATERSHED BELT.

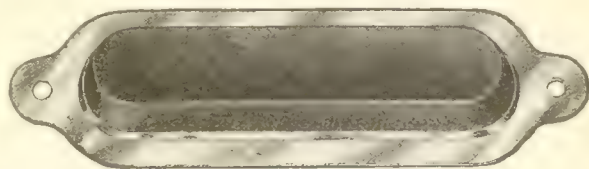
It is claimed that the belts here shown, when properly adjusted and proportioned to the power to be transmitted, will keep their adjustment, will not slip in wet weather and will give

efficient service for more than 10,000 miles on rough roads.

High-power motorcycles are still much in favor here in America, but, thanks to improvements in clutches and gear-sets, economical, light, low-power machines are rapidly being appreciated. Hence more study and investigation should be given to the qualities of rubber transmission belts for the latter type of motorcycles.

CLOSET-SEAT BUMPERS.

Rubber bumpers to be fastened to the under surface of water-closet seats have been used in various forms and designs for many years. The style shown here is one of several patterns made with nickeled escutcheon plates. In 1908 The Elastic Tip Co., Boston, Massachusetts, prepared molds to make a tip similar to this in style, but to be held in place by two screws, at the extreme ends, put through countersunk holes in the rubber. In May, 1909, Charles Pfau, of Cincinnati, Ohio, applied for a patent for a bumper substantially like this. The application was rejected several times, but one with some modifications was al-



lowed in February, 1915. As The Elastic Tip Co.'s molds were made the same month as the original application, namely, May, 1909, they could not antedate that application sufficiently to invalidate the patent.

Immediately upon the issuing of the patent Mr. Pfau organized the Long Seat Bumper Co., a holding company, which made arrangements with the Mechanical Rubber Co., of Cleveland, Ohio, to manufacture these bumpers and place them on the market. Notices were sent to the trade announcing the patent, together with warnings that suits would be brought if rubber manufacturers continued to make and sell such bumpers. It is said that in one or two instances suit has been invited.

Because there appeared to be only a comparatively small sale for such a bumper as that patented by Mr. Pfau, The Elastic Tip Co. decided to put out a line of various shapes, with metal escutcheons, this method of fastening differing from that employed in the Pfau patent. These are made with various lengths of bumpers, some having flat faces, like the one illustrated, while others have convex or semi-cylindrical faces, and on these there is a moderate, steady demand from hardware and plumbers' supply dealers.

GEO. S. COLTON ELASTIC WEB CO.

The Geo. S. Colton Elastic Web Co., Easthampton, Massachusetts, has increased its capital stock from \$250,000 to \$350,000 by the addition of \$100,000 preferred stock, \$50,000 of which has been sold to increase the working capital, the balance to be held for sale as the business may require.

George S. Colton is no longer connected with the company, his entire stock holdings having been purchased by C. A. Richmond, who has resigned as treasurer of the Glendale Elastic Fabrics Co. to assume active management of the Colton company. In order to correct current rumors, it is announced that neither this company nor Mr. Richmond has any connection with any other company in a similar line.

RUBBER MAN INSURED FOR \$1,800,000

Harry Thatcher Dunn, Toledo, Ohio, president of The Fisk Rubber Co., and vice-president of the Willys-Overland Co., is now counted among the largest life insurance policy holders, his total of \$1,800,000 being exceeded by only three or four other American business men. To take up this amount, several insur-

The Editor's Book Table.

PLANTATION RUBBER SECTION, TRADE SUPPLEMENT, "THE Times," London, England, December, 1916. [30 pages with maps of the rubber growing areas.]

WITH England controlling the growth and supply of plantation rubber, which now far exceeds the production of all other varieties, American manufacturers of rubber goods must look toward London for authentic information regarding this great British industry, and "The Times" has supplied a comprehensive summary, consisting of many signed articles by world-famous experts, covering virtually the whole field of rubber supply, manufacture and finance. That a copy for reference will prove invaluable to every consumer of crude rubber may be seen upon examination of the principal features of the table of contents reprinted below.

Rubber and War. Sir Frank Swettenham, K.C.M.G.
History of Plantation Rubber. Gilbert R. Redgrave.
The World's Rubber Position. W. H. Rickinson
Experimental Cultivation. Samuel Rideal, D.Sc., F.C.S.
Diseases and Pests. J. Mitchell, A.R.C., Sc.
Scientific Assistance. J. Bretland Farmer, F.R.S.
Some Present Needs. Wyndham Dunston, C.M.G., F.R.S.
Influence of Exhibitions. Sir Henry Blake, G.C.M.G.
Rubber, a National Asset. E. Stevenson.
The Rubber Growers' Association. C. Emerson.

Many other signed articles review planting in British dominions and abroad; getting rubber to market; rubber and finance; and rubber in industry, including vulcanization, testing, factory control, footwear, rubber heels, tires and synthetic rubber.

As to future supply, the constantly increasing demand of the American tire industry is recognized as a vital matter to be reckoned with. For six years past the annual consumption of the United States has averaged to increase 25 per cent, until it now totals more than half the world's entire production. Should this continue for five years, W. H. Rickinson expresses the belief that within that time the supply of crude rubber would become insufficient to meet the demand; that as far as can be judged at the present time, as 1907 was to 1910, so in all probability the position in 1918 will be to that of 1921.

ELEMENTS OF INDUSTRIAL CHEMISTRY. By Allen Rogers, D. Van Nostrand Co., New York City. [8vo, illustrated, 513 pages, cloth. Price \$3.]

This is an abridgment covering the salient points of the author's more comprehensive "Manual of Industrial Chemistry," the subjects being treated in a general manner only. As much detail as possible has been eliminated that the fundamental principles might be more clearly set forth. While the range of subject is not as broad as that of the larger volume, it is still sufficient to give the student a very comprehensive view of the entire field, and so fills a definite need. Rubber men will be particularly interested in the chapter on resins, oleo-resins and gum-resins, including india rubber. Of the other 26 chapters, those of particular value to the rubber trade include: Coal Tar and its Distillation Products, The Petroleum Industry, Essential Oils, Textiles, Water and its Purification, and Pigments, some of which are used as rubber compounding ingredients.

TROPICAL AGRICULTURE. BY FARLEY VERNON WILCOX, OF the United States Department of Agriculture. D. Appleton & Co., New York City. [8vo, 373 pages, illustrated. Price, cloth, \$2.50.]

Written primarily for the business man and agricultural student, this book tells what everybody ought to know about the tropics. It deals with agriculture in the commercial sense, and describes the nature, source and production of about 350 tropical commodities to eat, wear, and use in technical industries. Particular attention is given to the presentation of an intimate picture of animal industry, soils, climate and economic conditions.

A concise but comprehensive chapter has been devoted to rubber, in which gutta percha, balata, jelutong, chicle, camphor and other gums and resins are dealt with. The young man who contemplates locating in South or Central America will find particular interest in those chapters devoted to the tropical climate and its effects on man, farm animals and crops; the importance of tropical products and commerce; economic and social conditions and opportunities in the tropics; agricultural methods peculiar to the tropics and tropical soils.

COTTON FACTS. BY CARL GELLER. SHEPPERSON PUBLISHING CO., New York City. [16 mo., 240 pages, cloth. Price \$1.]

This statistical review has justly become the cotton man's ready reference work of the English-speaking world. In the present forty-first annual edition the material gathered for so many years by the late Alfred B. Shepperson has been brought up to date by Carl Geller and represents a remarkably comprehensive compilation of official and reliable data. Whether the information required relate to crops, receipts, exports, stocks, home and foreign consumption, visible supply, prices, acreage, or mills, in the United States or abroad, the index will disclose it quickly. Special features of this edition include the details of production of long-staple cotton in the United States; statistics of cotton in Great Britain since 1801; cotton yield in the United States by states and per acre from 1900 to 1915; and a table of important fluctuations of the January and July options on the New York Cotton Exchange from 1911 to 1916.

ADVERTISING BY MOTION PICTURES. BY ERNEST A. DENSCH. The Standard Publishing Co., Cincinnati, Ohio. [8vo, 255 pages, cloth. Price \$1.50.]

With the entire country under the spell of the motion picture it is not surprising that advertising agents have appreciated its mighty powers in direct as well as indirect publicity. The mission of the present book, therefore, is to set forth the possibilities of this latest medium for entering foreign and developing home markets; for introducing new and increasing the demand for older goods; for familiarizing the public with trade names, production sources and methods, and even facilitating direct salesmanship. Notable instances of the application of motion pictures in several lines of business are recounted, and many suggestions given for the preparation and display of films, together with other details making for the success of such a venture.

SPANISH-AMERICAN DIRECTORY AND BUYERS' GUIDE IN THE United States. Export Trade Directory Co., Inc., New York City. [Quarto, 570 pages. Price, paper covers, \$4; cloth covers, \$5.]

A very extended list of all manufacturers and dealers in the United States who are interested in foreign trade is provided by this large and important work intended for the use of business men in Spanish-American and Portuguese-American countries. The directory portion proper is very extensive, each heading being given in Spanish, Portuguese, French and English, while in the front of the book are indices in each of the four languages referring to the pages on which are to be found lists in the various trades. A portion of the book is divided into four sections, each section being of a different color paper and having an index in the corresponding language. Upon looking up an article in any one of the above-mentioned languages, its equivalent name is found in the other three. The book contains a vocabulary in these four languages of phrases necessary to the traveler, together with many technical terms frequently used in business correspondence. Tariffs for telegrams, money exchange and other data are tabulated. The various Latin-American countries are described from a commercial standpoint with hand-

some illustrations, and a great amount of information regarding the United States and especially New York City is included.

ANNUAL REPORT OF THE SECRETARY OF THE NAVY FOR THE fiscal year 1916. Published by the Government Printing Office, Washington, D. C. [Paper, 8vo, 143 pages.]

The navy, our first line of defense, is of interest to every business man, and according to this report the fiscal year ending June 30, 1916, has marked the largest expansion in times of peace, while the three-year building program covering a total of 813,000 tons, stands out beyond all precedent in the history of the United States. The year has seen marked advances in efficiency in many directions, but business men will find particular interest in the industrial activities of the shore stations and navy yards, and the growing tendency of the government to reclaim its own waste material and to manufacture many of its essential supplies as a matter of economy. The Navy Department is also going a step farther and interesting itself in conservation of natural resources, such as petroleum in naval reserve lands, and the encouragement of growing staples, such as cotton in Guam.

Rubberized fabric manufacturers will look with favor upon the increased attention being given to aircraft for sea service and the recommendation of the General Board that \$6,000,000 be appropriated in the 1918 program for naval aeronautics.

Full recognition of the importance of chemistry and every branch of engineering in national defense is seen in the activities of the Naval Consulting Board, which is cataloging our industrial resources, among which rubber manufacture ranks high, and bringing the minds of our greatest scientists to the solution of many big problems for the common good. These investigations promise to develop advances no less monumental than those in wireless telephony.

ANNUAL REPORT OF THE PAYMASTER GENERAL OF THE NAVY for the fiscal year 1916. Published by the Government Printing Office, Washington, D. C. [Paper, 8vo, 318 pages.]

Supplementing the report of the Secretary of the Navy, this shows that improved business methods, particularly in the purchase of supplies, have increased the purchasing power of every dollar to the maximum and effected a concrete saving of \$2,149,933, the total expenditures for the year being \$152,821,540.67. Manufacturers of rubber goods will be interested in the statement that of the \$207,672,299.82 property investment of the stores of the navy, \$473,288.07 is listed as insulated cable and wire, and \$326,854.54 as rubber packing, gaskets, etc.

CANADIAN TRADE INDEX. CANADIAN MANUFACTURERS' ASSOCIATION, Inc., Toronto, Canada. [Large octavo, 560 pages, cloth. Price, \$5.]

This book seems to supply a very full and comprehensive directory of the manufactures of Canada. The alphabetical list of articles occupies about 350 pages. This is followed by about 50 pages, giving an index, arranged alphabetically in French, of the headings in the main portion of the directory, thus rendering it valuable to that large class of people in Canada who use French preferably to the English language. There is also a complete alphabetical list of Canadian manufacturers, giving not only the main offices but the addresses of their factories. These two latter lists are printed on blue paper, one at the back and the other at the front of the book, thus enabling the user to turn at once to the desired section. A considerable amount of valuable mercantile information regarding the Dominion is also given.

STATISTICS OF MANUFACTURES, COMMONWEALTH OF MASSACHUSETTS. Twenty-ninth Annual Report, Bureau of Statistics, Boston, Massachusetts. [Paper, 8vo, 114 pages.]

According to this latest official source of information, the manufacture of boots and shoes continues to lead that of cotton goods as the greatest industry of Massachusetts, greatly exceeding in value the similar product of any other State and almost equaling the sum of New York, Missouri, New Hampshire, Ohio and

Pennsylvania, the other principal shoe producing States. The total value of the product of all industries in Massachusetts is given as \$1,641,373,047, of which \$255,188,013 represent boots and shoes, cut stock and findings. To this may be added rubber footwear to the value of \$23,788,788 manufactured by 8,087 wage earners in nine factories representing an investment of \$23,027,061. Woven belting and hose to the value of \$942,180, were produced by 183 operatives in six plants having an invested capital of \$906,033. Miscellaneous rubber goods amounted to \$23,011,349 and were the product of 4,743 wage-earners in 42 factories representing an investment of \$17,345,185. This includes automobile tires, which, unfortunately, are not given separately, although the total industry of the State is large.

NEW TRADE PUBLICATIONS.

Any of the following publications will be supplied by those issuing them, upon request.

The Osborn Manufacturing Co., Cleveland, Ohio, sends out a handsome, self-binding catalog so arranged that it can be kept up to date by mailing fresh pages to replace others in case of changes in styles or prices. The catalog numbers more than 300 pages, and contains well-arranged lists, voluminously illustrated, of the various lines of manufacture, including brushes and brooms, hardware specialties, foundry supplies, etc.

Among the various articles which are largely used by tire and rubber manufacturers, are hand wire scratch brushes, which are employed to take the place of sand paper, steel wool and other abrasives, and which, it is claimed, enable the user to do quicker and better work. These are made in various shapes and styles for many purposes. There is also a large line of rotary wire buffing brushes, as well as other lines of brushes and dusters especially suited for rubber mills, among which the company has a large trade.

* * *

"A Chain of Evidence" is the appropriate title of a handsome 20-page pamphlet issued by the Morse Chain Co., Ithaca, New York, to show the construction and many uses of the Morse silent chain for small power drives. Many large half-tones illustrate its application to pumps, mixers, rolling mills, ventilating fans, textile spinning frames and many other machines.

* * *

Two large and handsome wholesale catalogs for the 1917 season have just been issued by the Dunlop Rubber Co., Limited, Aston Cross, Birmingham, England. One is devoted to motor tires, wheels, rims and sundries, and features the Dunlop Plain, Grooved, Steel-studded, Rubber-studded, Combination Rubber and Steel-studded Tires, together with the Dunlop Detachable Wire Wheel, Twin Wire Wheel, and Steel Wheel. The other catalog contains only bicycle and motorcycle tires, rims and sundries. The bicycle line is exceptionally varied, and includes the Dunlop Magnum Roadster, Juvenile, Road Racing, Carrier, Tubular Sprint and Path Racing Tires; Warwick Roadster, Juvenile Speed Carrier, and Heavy Carrier Tires; the Cambridge Roadster and Juvenile, the Edinburgh Roadster, and Pericles. Each tire has an inner tube of corresponding brand. For motorcycles there are the Ribbed, also the Rubber-studded Motorcyclette tires, the Rubber-studded, Three-ribbed, Combination and Side Car Motorcycle tires, all with beaded edge; and the Ribbed Racing and Rubber-studded, both wired on. Butt-ended tubes are recommended for these. An accompanying circular describes the Dunlop golf balls.

* * *

Editorially, and in an article on electric drive and safety controls in rubber mills, elsewhere in this issue, the increasing importance of electricity and electrical devices in the manufacture of rubber goods has been emphasized. Thus the 1916 Electrical Supply Year Book, published by the Western Electric Co., Incorporated, New York City, will be of value to every factory

superintendent and electrician. Including as it does the seemingly infinite number and variety of devices and equipment manufactured by this great and rapidly growing firm, this 1,500-page large octavo volume, bound in boards, is at once a descriptive catalog and a price-list. Rubber parts are conspicuous in the construction of much electrical equipment and, as shown by the index, electricians find frequent use for such rubber goods as boots, casings, gloves, matting, rings, rods, sheets, tubing, vulcanizing rubber and cements.

* * *

The Lenz Apparatus Co., New York City, formerly Lenz & Naumann, Inc., has issued a large, well-illustrated, cloth-bound catalog of general laboratory apparatus and supplies that merits a place in the reference library of every industrial chemist. Its 499 pages include virtually everything in laboratory equipment and the work is prefaced by 15 pages of general chemical information, chiefly tabular matter. Over 6,000 articles are listed, most of them being illustrated and bearing serial numbers for ready reference to the description and price.

* * *

A special catalog and price list of hose has been issued by the Peerless Rubber Manufacturing Co., New York City, manufacturer of mechanical rubber goods for all purposes. Profusely illustrated, artistically arranged and well printed, its 48 pages emphasize the highly specialized business hose manufacture has become, with many sizes, weights and types of construction for varied needs. Several fabric and wire as well as rubber coverings are shown as well as metal-lined suction hose. The line also includes couplings, nozzles and rubber tubing.

HOLIDAY GREETINGS.

THE arrival of many attractive and useful articles of infinite variety from friends desirous to express kindly remembrance renews the spirit of the holiday season and reminds us agreeably of the arrival of the year 1917. For these holiday greetings which are enumerated below we express our sincere thanks, and take this opportunity to wish the rubber trade collectively and individually a prosperous New Year. And may this coming twelvemonth see the establishment of a lasting concord among the nations which will permanently insure the brotherhood of man.

SOUVENIRS AND NOVELTIES.

George F. Lufbury, Jr., manufacturer of chemicals, Elizabeth, New Jersey, has sent another of his unique calendars so valuable for reference in every office. Each sheet carries three months, the current month being centrally located in bold face type, and the previous and coming month being respectively above and below in outline type.

John Royle & Sons, Paterson, New Jersey, are distributing their ever-welcome leather-bound, vest-pocket diary with the usual tabular matter and memorandum pages in addition to the daily spaces. Motorists will welcome the tire mileage record page, and with foreign affairs uppermost in every mind it was a happy thought to insert the many colored maps of the world.

CARDS AND CALENDARS.

J. W. Coulston & Co., importers and manufacturers of dry paints and colors, New York City.

J. H. Day Co., rubber mixers, Cincinnati, Ohio.

Edward B. Fulper, importer and manufacturer of minerals, acids and chemicals, Trenton, New Jersey.

Holmes Bros., rubber molds and special machinery, Chicago, Illinois.

L. J. Muttly Co., rubber cloths and tubing, Boston, Massachusetts.

New Jersey Rubber Co., dealer in all kinds of reclaimed rubber, Lambertville, New Jersey.

J. H. Stedman Co., scrap rubber merchants, South Braintree, Massachusetts.

E. M. & F. Waldo, colors for rubber compounding, New York City.

Charles E. Wood, broker in crude rubber, balata, gutta percha and kindred products, New York City.

Davol Rubber Co., manufacturer of druggists', surgeons', dentists' and stationers' sundries, Providence, Rhode Island.

Monatiquot Rubber Works Co., reclaimer of waste rubber, South Braintree, Massachusetts.

RUBBER FOOTWEAR PRICES.

AS has been the custom for many years (with a single exception), the manufacturers of rubber footwear will announce their prices, terms and discounts for the coming year on January 1. The plan usually is to time the mailing of the information so it will reach the wholesalers simultaneously in every part of the country. The manufacturers are unwilling to give out any information regarding this matter in advance, and THE INDIA RUBBER WORLD is unable, therefore, to print any official news on this subject in this issue.

There is no doubt, however, that prices will be materially advanced. Those in effect up to December 31, 1916, were practically the same as those made March 1, 1915, though the price lists of January 1, 1916, showed advances of five cents or less.

The rubber boot and shoe situation at the present time is peculiar. This business is dependent almost entirely on climatic conditions. If the winter be mild, retail and wholesale dealers will generally carry over sizable stocks to the following season. Should there be considerable snowfall, naturally the stocks will be sold out. When there are several early snow storms, the chances are for a much heavier consumption of footwear during the season, for people who start wearing rubbers early, are likely to need a second pair before the winter is over.

Last winter was a mild one, and in February or March, stocks of rubbers were large, but late severe storms so affected the trade that stocks were depleted, and almost no rubbers were carried over. This resulted in the placing of heavier advance orders than usual, and many of the manufacturers found their factory capacity sold very early in the summer. The demand for help in the munition factories resulted in a drain on the working forces in the rubber factories, and secondarily in labor troubles. The consequence has been that the manufacturers, foreseeing that all orders could not be filled, adopted the plan of distributing their output proportionately. In this way most of the wholesalers have received 80 or 90 per cent. of their orders. By the terms of their contracts with some of the manufacturing companies, the unfilled portions of their orders are automatically cancelled at the conclusion of the contract period, namely December 31, unless specifically renewed at the new prices.

Regarding the 1917 price lists, there is this much to be said. Brazilian rubber prices are about 15 per cent higher than they were when the 1916 prices were made, while plantations are practically the same. But everything else entering into the manufacture has advanced, some as much as 100 or 200 per cent. Chemicals and compounding ingredients show such advances. Cotton fabrics are 50 to 60 per cent. higher, and labor costs 10 to 20 per cent. more. Taking these into consideration, the manufacturers would seem justified in making a material advance in their prices, and they will undoubtedly do so.

ICE BAGS RULED MANUFACTURES OF COTTON.

Judge Cooper, New York City, has sustained the Board of Appraisers in classifying ice bags of cotton and rubber, imported by Knauth, Nachod & Kuhne, as manufactures of cotton assessable at 30 per cent, the importers having claimed 15 per cent duty as manufactures of india rubber or gutta percha commonly known as druggists' sundries.

Interesting Letters from Our Readers.

BELGIAN EXPERT DEVISES CASTILLOA KNIFE.

TO THE EDITOR OF THE INDIA RUBBER WORLD:

DEAR SIR—I write to call your attention to a colossal on page 45 some interesting particulars about rubber growing in Mexico. The letter signed "Planter" does not surprise me. Perhaps you will remember I have always maintained that the two rubber trees most difficult to handle are the *Castilloa* and *Funtumia*. Still, when worked judiciously, good results can be obtained. Perhaps you may recall that four to five years before the war I made some technical reports about *Castilloa* for two of the most important American companies growing rubber in Mexico. I have made a special study of the knife required for *Castilloa*, also the method of tapping and coagulating the latex. If I could be in Brussels I would send you samples of Mexican *Castilloa* coagulated by myself which compare favorably with the best plantation Para in Middle East.

Kindly send my card to "Planter" and advise him that I am prepared to make a full technical report dealing with the following items:

1. How and when to commence tapping.
2. My design for a suitable knife.
3. Spout and cups to be used.
4. How to coagulate and prevent sweating of *Castilloa* rubber.
5. The best shape for the rubber.
6. Methods of packing.

G. VAN DEN KIEPPEL.

26 Stanhope Road, Highgate, London N., England, November 11, 1916.

THE BIGGEST OF ALL HEVEAS.

TO THE EDITOR OF THE INDIA RUBBER WORLD:

DEAR SIR—I write to call your attention to a colossal *Hevea*, probably the largest in the world. It is 127 feet in circumference at the base, and has a record of yielding for 120 days an average of 22 pounds of rubber a day. As you have of late been publishing notes on the world's largest rubber trees, I am pleased to be able to supply the actual facts regarding this tree.

It is situated at the Seringal Porvir on the River Acre in Brazilian territory at a considerable distance from the Bolivian frontier. This seringal is now the property of a friend of mine, Colonel Antonio Vieira de Souza. The tree is exploited by a whole family, father, mother, and several children, and its yield is about as stated. This family divides its time between cultivating the cereals necessary for food and the extraction of the rubber latex. This is not the only giant *Hevea* tree in that region. There are thousands of them, but this is the largest under exploitation. Just at this point the country is considerably higher than the whole surrounding lands, which leads to the conclusion that it was from the seed of these denizens of the forest that the *Hevea* found its way both east and south of Brazil, for native *Hevea* is found as far south as the seventeenth degree, and as far east as the south of Maranhão.

This tree must have been growing long before Columbus discovered America. No such thing as a rubber plantation exists in the upper Amazon, and the trees which have been planted here and there in the whole north of Brazil cannot properly be called plantations. The only practical attempt in this direction was made by me in lecturing on the subject at the Engineers' Club in Rio de Janeiro in 1912, by virtue of which the Brazilian Government promulgated laws offering prizes for the planting of rubber and establishing experimental stations throughout the

rubber region, especially at Piahy, Maranhão, Bahia and Pará; but just when this was about to be put into practice, financial difficulties arose, and since then the war has made impossible any attempt in that direction.

J. SIMAO DA COSTA.

Pará, December, 1916.

COTTON CROPS THREATENED.

TO THE EDITOR OF THE INDIA RUBBER WORLD:

DEAR SIR—I am spending the month of December studying the cotton situation in the southern States and I have noticed a point which I believe will interest you and the readers of THE INDIA RUBBER WORLD. The boll weevil which entered Texas at Brownsville in 1892 has advanced at the rate of about 65 miles per year and has now covered half of Florida. The Sea Island cotton is threatened today and entomologists believe that it will affect this cotton even worse than it affected the uplands or short staple cottons.

The estimated loss caused thus far by the boll weevil is one billion dollars. In Florida alone in 1915 the loss was approximately one million dollars. Sea Island cotton matures late and will therefore suffer markedly from the attack of the boll weevil. The supply of Sea Island will be cut short. It is small enough under ordinary conditions. On November 20 it sold in New Bedford, Massachusetts, at 52 cents per pound; if the yield per acre is cut down to one-third of the present, the price will become prohibitive.

Tire duck manufacturers will have to abandon Sea Island cotton. They will have to fall back on ordinary staple cottons and the strength of the fabric will have to be secured in some other way. Either the structure of the yarns and fabric must be changed, or the fabric must be given a chemical treatment to increase its strength.

This whole subject is of such far reaching importance that it cannot be given too much serious attention. It is, in my mind, worthy of immediate consideration by the tire manufacturers.

FREDERIC DANNERTH.

Atlanta, Georgia, December 6, 1916.

WATCHING THE ENEMY.

THAT our esteemed contemporary, "Le Caoutchouc & la Gutta Percha," seems every line of THE INDIA RUBBER WORLD, and with the keenest sort of analysis, may be gathered from the following:

"Patent Literature" is always very interesting to read and in it one often meets interesting things.

Thus, going through the September issue of THE INDIA RUBBER WORLD, we see that Messrs. Max Theumann and Joseph Koestchet have sold to the Société Chimique des Usines du Rhône their American patent, No. 1,191,439, referring to the preparation of ethers of cellulose.

Would it be an indiscretion to inquire into the nationality of Messrs. Max Theumann and Joseph Koestchet, whose names sound strongly German?

We further see in this same "literature" that the Société Générale des Caoutchoucs de Térébenthine (General Turpentine Rubber Co.) has taken out a Canadian patent, No. 168,727, the object of which is to reclaim old rubber by means of tetrachlorethane. The process is, no doubt, the same as that patented last year by Count Charles de Villers.

COPY OF THE INDIA RUBBER WORLD, and of the above, on request.

The Obituary Record.

A VETERAN RUBBER IMPORTER.

HENRY A. GOULD, head of the Gould Commercial Co., Inc., 12 Bridge street, New York City, dealer in crude rubber and tires, and without doubt the dean of American crude rubber men, died December 25 in the Overlook Hospital, aged 73. He was a resident of Chatham, New Jersey.

Mr. Gould was born and lived many years in Boston, Massachusetts, attending the public schools there and receiving his mercantile education in the offices of P. & J. P. Hawes & Co., an East India house with which he remained for four years. At the age of 21 he became a partner in the East India brokerage firm of Robert Williams & Sons, Boston, established in 1834 and the leading brokers in East India products, especially rubber and gutta percha, having prominent connections in New York. Five years later he retired from the firm and spent a year traveling in the West, where he represented large financial interests in Duluth and Minnesota prior to the panic of 1873.

Deciding to remain in the Eastern financial centers, Mr. Gould opened an office in Boston on his own account for dealing in rubber, with Earle Brothers as a New York connection. Later the Gould Commercial Co. was organized in New York to import aniline dyestuffs and refine crude camphor, three of the five American camphor refineries being acquired by the company.

In 1897 the Boston business, conducted under the name of Henry A. Gould, and the New York business of the Gould Commercial Co. were consolidated as the Henry A. Gould Co., with headquarters in New York and a branch in Boston. It was decided to concentrate upon crude rubber, and branches were therefore opened in Trenton, New Jersey, Para and Manaos, Brazil, and later in London, England. Representatives were located in Mexico, Central and South America, and Africa, as a result of which many new grades were introduced to American trade, notably Pontianak.

The Henry A. Gould Co. was incorporated in New Jersey in 1902, and again in New York in 1905. The Gould Commercial Co., Inc., to which he was devoting himself at the time of his death, was a Delaware company incorporated in 1914. During Mr. Gould's varied career in many branches of the rubber industry, including import, export and manufacture, many young men have learned the business under the guidance of his broad experience, no less than ten of them having since become leading rubber merchants.

In 1902 Mr. Gould married Miss Edna F. Ellis, of Philadelphia, Pennsylvania, and it is said to have been largely through her influence that he had previously become treasurer and active superintendent of the New York Rescue Band, which maintained clubrooms, employment bureau, etc., on Fourteenth street, New York City.

A RUBBER COMPANY FOUNDER.

In the recent death of Henry Binns, Passaic, New Jersey, has lost the father of many important business enterprises and an inventor of note. Mr. Binns was an iron molder by trade, and although born in England and the inventor of a device for planing armor plate used in the British navy, also invented the first steam hammer used by the Krupps of Germany in building their 100-ton guns. In 1869 he came to America and was one of the founders of the Manhattan Rubber Co., Passaic, New Jersey, the Hobart Trust Co., the New Jersey Engineering & Supply Co. and the Guarantee Mortgage & Title Insurance Co.

Mr. Binns is survived by his wife, six children and nineteen grandchildren.

A NEW ENGLAND RUBBER CLUB PRESIDENT.

John Henry Flint, president of the Tyer Rubber Co., Andover, Massachusetts, died at his home in that town November 29, in the seventy-fifth year of his age. Mr. Flint was born in Andover, and after a public school education entered the market business, at the same time developing his real estate inter-

ests. He early became interested in the Tyer Rubber Co., and was made a director in the company in 1876. From 1882 to 1913 he occupied the position of treasurer, and in the latter year was elected president of the company, which office he held up to the time of his death. He was a director of the Rubber Manufacturers' Mutual Insurance Co., and served for two years as president of the New England Rubber Club.



J. H. FLINT.

Besides his interest in the rubber business, he was intimately connected with business and town affairs in Andover. For 34 years he was connected with the Andover Savings Bank, a part of that time as president, and was also a director in the Andover National Bank and a director in the Merrimack Mutual Fire Insurance Co. He served the town of Andover as selectman, assessor, town clerk, treasurer, chairman of the Water Commission, chairman of the Board of Public Works, and chief of the Fire Department. He was a member of Masonic and Odd Fellows Organizations, and of the Andover Club. In 1873 he married Miss Frances A. Tyer, who survives him, as do also two married daughters.

Mr. Flint was noted for his keen judgment in business matters. He was straightforward, shrewd, possessed of a kindly humor, and deserved and possessed a host of friends.

PIONEER RECLAIMER.

George Agnew, founder of the Raymond Rubber Co., Titusville, New Jersey, died early last month at Mercer Hospital, Trenton, New Jersey, aged 80 years. The Raymond company, which formerly operated under several other names, is a rubber reclaiming concern. After a long and successful career in the reclaiming business, Mr. Agnew retired from active work about eight or ten years ago, and three of his sons, Raymond H., Robert P. and John B. Agnew, now carry on the business.

MANY YEARS MANAGER OF A RUBBER COMPANY.

In the death of Frank DeWitt Hotchkiss, December 23, after long suffering with liver trouble, Fairfield, Connecticut, loses one of its most prominent citizens. For 28 years he had been manager of the Fairfield Rubber Co., now the Du Pont Fabrikoid Co. Indeed he had been identified with the rubber industry

from boyhood. Mr. Hotchkiss began his career in association with his father, who was one of the founders of the Goodyear Rubber Co., at Naugatuck, Connecticut, and upon his father's death became connected with the American Rubber Co., Boston, Massachusetts, whence he went to Fairfield permanently.

Held in high esteem by all, and regarded as one of the leading citizens of Fairfield, he never aspired to public office. He was a member of the Automobile Club of Bridgeport, the Wednesday Afternoon Musical Club, Trinity church vestry, Southport, Connecticut, and a charter member of Sentinel Lodge, I. O. O. F., of Naugatuck.

Mr. Hotchkiss was 65 years of age and is survived by his wife, three daughters and two sons.

DIRECTOR IN A RUBBER COMPANY.

Josiah Quincy Bennett, who died at his residence in Cambridge, Massachusetts, November 28, was a director in the Boston Woven Hose & Rubber Co., Cambridge. Mr. Bennett was born in Somerville, Massachusetts, 62 years ago, educated in the public schools of that city, and entered the banking business, but for years has been connected with electric light and power companies in New England and was identified with several other corporations. He is survived by his widow, three sons and one daughter.

A MANUFACTURER OF WEBBING.

Alfred C. Woodward, of the Victoria Webbing Co., North Abington, Massachusetts, died December 10, at Redlands, California, where he had gone in the hope of regaining his health. About the middle of October he had retired from business and leased his factory to his brother, George Woodward.

Mr. Woodward was a native of England, coming to this country at the age of 13 years and from that date being engaged in the webbing business. He was for a time manager of the Brighton mills, at Passaic, New Jersey, and for several years a member of the firm of Dean, Chase & Co., and manager of their goring factory at Rockland, Massachusetts, previous to establishing the Victoria company about 22 years ago.

PHOTOGRAPHS OF THE BRAZILIAN RUBBER INDUSTRY.

With the close of the great Panama-Pacific International Exposition, San Diego, California, comes a matter that may interest some in the rubber trade. It will be remembered that a wonderful collection of pictures illustrating the Brazilian rubber industry was exhibited, and these photographs are now to be sold. A complete list of them may be seen at the office of THE INDIA RUBBER WORLD, or by communicating with Dr. Eugenio Dahne, care of the A. T. Deer Co., Hornell, New York.

FACTORY DEDICATION AT LA CROSSE.

The La Crosse Rubber Mills Co., La Crosse, Wisconsin, dedicated the new addition to its plant on December 5, by a concert and ball, which was attended by over 5,000 persons. The new building was lavishly decorated, the second story used as a cloak room, the third as a cafeteria, where refreshments were provided, and in the upper was given an orchestral concert, during which addresses of welcome were made by President Hirshheimer, Secretary A. P. Funk and Treasurer A. S. Funk. The floor was then cleared for dancing, in which hundreds participated until the small hours of the morning. The affair was one of the most notable events in the history of La Crosse.

The new building is of modern, fireproof, concrete and steel construction, 210 feet long. The first floor will be used as a stock and shipping room, the other three for the manufacture of rubber footwear. The company now employs 675 persons. When the new building is equipped, it is estimated that there will be room for 1,400 workers in the entire plant, and the capacity will be increased to 25,000 or 30,000 pairs a day.

THE ANNUAL BANQUET AND MEETING OF THE RUBBER CLUB.

THE annual banquet of The Rubber Club of America, Inc., will be held at the Waldorf-Astoria, New York City, on the evening of January 8, at 6:30 p. m. The elaborate arrangements and interesting program prepared for this occasion will far surpass all previous efforts. The great interest shown by the members of the Rubber Club in this event promises a much larger attendance than that of a year ago.

Colonel Samuel P. Colt will be one of the speakers. Hon. William H. Taft will speak on "After the War, What?", and the subject of Bishop Du Moulin's speech will be, "The World Unrest." The address of F. A. Vanderlip will be a special message to the rubber trade.

The boxes in the banquet hall will be at the disposal of ladies and other guests, after 9:00 p. m., affording them an opportunity of hearing the after-dinner speakers.

The annual meeting will be held at the Waldorf-Astoria, January 8, at 2:30 p. m. The officers' reports will be submitted and the following nominations for directors during the ensuing year will be voted upon:

William E. Bruyn, L. Littlejohn & Co., New York City.
Van H. Cartmell, Kelly-Springfield Tire Co., New York City.
Harvey S. Firestone, Firestone Tire & Rubber Co., Akron, Ohio.
H. Stuart Hotchkiss, United States Rubber Co. System, New York City.
William J. Kelly, Arnold & Zeiss, New York City.
P. W. Litchfield, Goodyear Tire & Rubber Co., Akron, Ohio.
J. S. Lowman, Philadelphia Rubber Works Co., Akron, Ohio.
W. O. Rutherford, The B. F. Goodrich Co., Akron, Ohio.
Charles T. Wilson, Charles T. Wilson Co., New York City.
Tracy S. Lewis, Beacon Falls Rubber Shoe Co., Beacon Falls, Connecticut.
John A. Lambert, Acme Rubber Manufacturing Co., Trenton, New Jersey.
Charles A. Daniel, Quaker City Rubber Co., Philadelphia, Pennsylvania.

The annual meeting of the retiring board of directors will be held at the Union League Club, New York City, January 6, at 12:30 p. m.

The following division meetings will be held January 8, at the Waldorf-Astoria: The Mechanical Rubber Goods Manufacturers' Division, 1:30 p. m.; the Rubber Sundries Manufacturers' Division, 11 a. m.; the Fiber and Rubber Sole Manufacturers' Division, 10:30 a. m.

IMPROVED PACKING OF PLANTATION RUBBER.

THE Rubber Club of America, Inc., through its efficient Secretary, interviewed 60 leading rubber manufacturers upon the subject of improved methods of packing rubber. The following digest of suggestions contains much of value:

1. That a heavy paper be placed inside the boxes.
2. That rubber be packed in muslin or sheeting bags and then boxed.
3. That boxes be made to hold between 200 and 300 pounds to lessen handling.
4. That boxes be of a nature to permit the taking down and reassembling without the removal of binding iron and nails.
5. That cases be lined with tin and made stronger.
6. That one grade of rubber be placed in a case and that the top layers be of no better quality than the layers beneath it, in order to avoid deceiving the importer.
7. That a standard for the various grades of rubber be fixed by the Rubber Club in connection with the Rubber Importers' Association.
8. That a case be devised that has some practical method of opening the lid for inspection, to which cases of rubber are sub-

jected at various ports, without splitting it all to pieces and at the same time permitting of a fastening that would stand shipping.

9. That interior finish of cases be smooth and the joints made closer.

10. That a certain amount of soapstone be placed between the sheets of rubber to avoid moisture from sweating.

11. That hardwood cases be used.

12. That great care be used in cooping packages.

13. That rubber be baled and burlapped.

14. That the present Japanese Momi cases be fastened securely around both end edges and also around the middle, both endwise and crosswise of the package, with metal strapping.

15. That in the case of Venesta boxes metal straps around all edges be nailed instead of riveted.

16. That less rubber be packed in cases.

17. That Jelutong and Red Serayah wood be used.

18. That a larger package be used divided into compartments in the middle to avoid rubber shaking down to one end of chest in transit.

19. That a rapidly revolving wire brush be applied to the interior of the box on a suitable vacuum cleaning nozzle.

20. That wider box stripping and special care as to the placing of nails be used.

21. That more care be given to the placing of the inscription on boxes of rubber "Store Away From Boiler."

22. That greater care be given to the unloading and reloading of ships and less handling take place in the warehouse.

23. That rubber be packed dry and not damp, causing a shrinkage above the 2 per cent allowed by sellers.

RUBBER TRADE INQUIRIES.

THE EDITOR OF THE INDIA RUBBER WORLD HAS RECEIVED, HOWEVER, THEY ARE OF INTEREST, NOT ONLY IN SHOWING THE NEEDS OF THE TRADE, BUT BECAUSE OF THE POSSIBILITY THAT ADDITIONAL INFORMATION MAY BE FURNISHED BY THOSE WHO READ THEM. THE EDITOR IS THEREFORE GLAD TO HAVE THOSE INTERESTED COMMUNICATE WITH HIM.

[242.] Names and addresses of manufacturers of the following are requested: Cartons, inner tube boxes, sheetings, liners, tapes and heavy gage sheet zinc for cutting tables.

[243.] A rubber company wishes to buy washed and dried rubber in ton lots.

[244.] A correspondent wishes to be placed in communication with an engineer or firm of engineers who specialize in constructing and mechanically equipping new tire plants.

[245.] Information is desired concerning the substance and manufacture of shellac compositions resembling hard rubber.

[246.] Names of manufacturers of tire valves and sundries have been requested.

[247.] A correspondent wishes to be placed in touch with manufacturers of tire fabrics, particularly breakers, thread and chafing fabrics, as well as tape.

[248.] Information is requested, with a view to purchase, regarding a machine that will put a bead on transparent dipped rubber goods such as balloons, nipples, etc.

[249.] The address of a manufacturer making steam cure splicing apparatus is desired.

[250.] A list of solid tire manufacturing concerns has been requested.

[251.] Manufacturers of inner tubes constructed of rubber and cotton fabric are sought.

[252.] A correspondent desires to know where to obtain candle tar.

[253.] Names and addresses of firms manufacturing machinery for extracting rubber from the guayule plant are requested.

[254.] An inquirer wishes to know what concerns make ball-bearing hand stitchers.

[255.] Names of manufacturers of dental rubber are requested.

[256.] A correspondent wishes to be placed in touch with manufacturers of tri-nitro-benzene.

[257.] Important manufacturers of rubber, celluloid and asbestos goods in Spain are eager to subscribe to American publications containing, regularly, information of interest to celluloid manufacturers.

[258.] An inquirer wishes to know where the different varieties of rubber seed may be obtained.

[259.] A correspondent asks who manufactures rubber gloves with cloth lining.

[260.] The names of makers of rubber sheet cutters or choppers are desired.

[261.] A correspondent requests information concerning manufacturers of woven cotton hose jackets.

[262.] Firm names and addresses of concerns manufacturing machines for cutting square hydraulic packing and pure gum strip packing are sought.

[263.] Names of manufacturers of test piece grinders and cutters are desired by a rubber laboratory.

[264.] A correspondent asks who manufactures the Rubin Duplex water bottle.

TRADE OPPORTUNITIES FROM CONSULAR REPORTS.

A firm in Russia, with a branch office in the United States, would like to communicate with American manufacturers of garters, etc. Report No. 23,241.

A manufacturer of pharmaceutical products in Switzerland is in the market for collapsible tubes and sprayers for bottles. Report No. 23,248.

Representation of American manufacturers of garters is desired by a firm in Brazil. Report No. 23,302.

A man in Brazil is in the market for garters. Report No. 23,319.

A firm in India desires to communicate with American manufacturers and exporters of rubber heels. Report No. 23,323.

A Swiss firm is in the market for rubber cloth, rubber balls, tennis balls and raincoats. Report No. 23,325.

THE RUBBER CLUB OF MANAOS.

The *Clu^l da Seringueira* is the name of an agricultural association recently formed in Manaus for the purpose of advancing the rubber planting industry of Amazonas, Brazil. "*A Seringueira*," the monthly official organ of the association, was first published on July 24, 1916, and has appeared regularly since that time. Its present scope and bulletin form will be enlarged in the near future, in order to reflect the practical knowledge and general information on the rubber planting industry now available.

DRESS SHIELDS FOR READY-TO-WEAR GARMENTS.

Dress shields of rubberized fabric are soon to become a regular part of all ready-to-wear gowns, suits and coats for women if the national campaign of a leading manufacturer succeeds. It is to be the contention that dress shields are just as necessary to a finished garment as hooks and eyes or other fasteners. The new spring garments will probably introduce dress shields to thousands of women not using them at present, so the retailer will benefit rather than suffer by the custom. As the life of a dress shield is about three months it must subsequently be replaced at the notion counter.

SAVAGE TIRE CO. DEVELOPS A SIDE LINE.

This firm has in its plant at San Diego, California, a complete equipment of metal work machines, and has begun the manufacture of the Thurston Motor Fuel Gasifier, a device for increasing gasoline mileage in motor cars and making possible the use of lower test distillate and other cheap substitutes for gasoline.

News of the American Rubber Trade.

NEW PRESIDENT OF THE GENERAL RUBBER CO.

ON his return from a five months' trip to the Far East, H. Stuart Hotchkiss, of the United States Rubber Co. System, was made president of the General Rubber Co., of New York.



H. STUART HOTCHKISS

This great company comprises the following subsidiaries: Wm. Symington & Co., Limited, London and Liverpool; the General Rubber Co. of Brazil, Manaus and Para; the General Rubber Co., Singapore, Straits Settlements, Colombo, Ceylon and Medan, Sumatra; the following rubber plantation companies: Hollandsch-Amerikaansche Plantage Maatschappij, Ashan Sumatra; Nederland Langkat Rub-

ber Maatschappij, Langkat, Sumatra, and Si Paré Paré Rubber Maatschappij, Tebing Tinggi, Sumatra.

Mr. Hotchkiss brings to his responsible position a peculiar fitness together with an unusual degree of preparedness. Thoroughly conversant with the factory side of the rubber trade though his long connection with L. Candee & Co., New Haven, Connecticut; with the administration end as a member of the Operating Council of the United States Rubber Co.; with the crude rubber end by reason of his many visits to the South American rubber centers and to the Far East, he knows all sides of his subject.

Other officers of the General Rubber Co. are as of yore, with the single exception of W. Stuart Gordon, who has become vice-president.

RUBBER COMPANY SHARE QUOTATIONS.

The following market quotations of shares of rubber manufacturing companies on December 23 are furnished by John Burnham & Co., 115 Broadway, New York City, and 41 South La Salle Street, Chicago, Illinois:

	Bid.	Asked.
Ajax Rubber Co. (new).....	72½	73
Firestone Tire & Rubber Co., common	135	140
Firestone Tire & Rubber Co., preferred	107	108
The B. F. Goodrich Co., common	59¾	60
The B. F. Goodrich Co., preferred	110	112
Goodyear Tire & Rubber Co., common	285	290
Goodyear Tire & Rubber Co., preferred	108¾	109½
Kelly-Springfield Tire Co., common	58½	60
Kelly-Springfield Tire Co., preferred	94	96
Miller Rubber Co., common	245	250
Miller Rubber Co., preferred	106	107
Portage Rubber Co.....	178	182
Rubber Goods Manufacturing Co., preferred.....	...	...
Swinehart Tire & Rubber Co.....	...	87
United States Rubber Co., common	60	62
United States Rubber Co., preferred	111½	113

Replete with information for rubber manufacturers.—Mr. Pearson's "Crude Rubber and Compounding Ingredients."

SCRAP RUBBER DEALERS MEET.

The Rubber Scrap Division of the National Association of Waste Material Dealers held a meeting at the Hotel Astor, December 20, 1916, with Paul Loewenthal as chairman. After disposing of the routine business there was a discussion of trade matters generally that revealed a most satisfactory understanding between the members present. The classification committee recommended that no changes be made at this time, although some corrections may be made at the summer meeting. The grievance committee reported that no cases had been submitted for adjudication since the last meeting. Observance of specifications long in force in packing material are held responsible for this. Details of the new circular, which will be issued at the regular time, were fully discussed and found satisfactory. The attendance was good, about 25 members being present, and the banquet held that evening at the same hotel an unqualified success. The next meeting will be held in March.

AJAX RUBBER CO. ABSORBS RACINE.

At a special stockholders' meeting of the Ajax Rubber Co., Inc., New York City, the recent taking over of the Racine Rubber Co., Racine, Wisconsin, by the Ajax company was ratified. This consolidation is an important one, calling for an increase of capital stock from \$5,000,000 to \$10,000,000. The Ajax company has built up a national business through a large selling organization, while the Racine company has acted as distributor and built up a very profitable business at low selling cost, and the combination of interests will add to the power of both companies. The Racine Rubber Co. will maintain its corporate existence and will practically continue, without change, its selling policy, the Ajax company being used as a holding company for Racine stock.

RUBBER COMPANY DIVIDENDS.

The Rubber Goods Manufacturing Co. paid its 71st regular dividend of 1¾ per cent on preferred stock, December 15, to stockholders of record December 11.

The Boston Woven Hose & Rubber Co. paid the regular quarterly dividend of 3 per cent on common stock and semi-annual 3 per cent dividend on preferred stock, December 15, to stockholders of record December 5.

The Kelly-Springfield Tire Co. has declared a quarterly dividend of 1½ per cent on 6 per cent preferred stock, payable January 2 to stockholders of record December 16.

The Barrett Co. has declared a quarterly dividend of 1¾ per cent on both common and preferred stock, payable January 2 to common stockholders of record December 20, and on January 15 to preferred stockholders of record January 5.

An extra dividend of 10 per cent on the common capital stock has also been declared, payable January 25, to stockholders of record December 20.

The board of directors of the Keystone Tire & Rubber Co., New York City, has declared a quarterly dividend of 2 per cent with an addition 1/3 per cent on the preferred stock and a regular quarterly dividend of 3 per cent on common stock, payable January 2 to stockholders of record December 22.

The Westinghouse Electric & Manufacturing Co. has declared a quarterly dividend of 1¾ per cent on the common stock, payable January 31, and a quarterly dividend of the same amount on the preferred stock, payable January 15, both dividends payable to stockholders of record December 30. The common dividend is an increase of ¼ of 1 per cent over the last payment.

M. M. CONVERSE.

MARQUESS M. CONVERSE, head of the Converse Rubber Shoe Co., Malden, Massachusetts, was born in Lyme, New Hampshire, October 23, 1861. After attending the district school



there he completed his education at the Lebanon (Vermont) Academy, and at the age of 18 went to Sherbrooke, Province of Quebec, Canada, for about a year, as telegraph operator.

Coming to Boston in 1880, he entered the department store of Houghton & Dutton, where he officiated for a year as buyer, and for the

next five years as superintendent. His health then giving away, he was warned by his physician that he must go to the country. At Lebanon, New Hampshire, he then bought the small department store of G. W. Houghton, a brother of Samuel Houghton, of Houghton & Dutton, and the originator of the department store idea. There he remained until 1887 when, with health regained, he returned to Boston, and with Henry L. Pike formed the partnership of Converse & Pike and assumed the selling agency in that city of the Wales-Goodyear line of rubber footwear.

The new firm occupied comparatively small space on the second floor of a building near the large store of W. L. Sage, at that time probably the principal rubber jobber in Boston. Within a few days, Mr. Sage, who, it will be remembered, always dressed in the height of fashion and rather showily, walked into the Converse & Pike establishment and introduced himself as "William Lincoln Sage, your competitor across the street." Taking it for granted that the young men knew nothing about the business, he at once offered them the opportunity to look over his establishment and see the arrangement of floor space and the building of bins for sorting the goods. Not only that, but he offered to impart to them any knowledge he might have regarding the credit of such customers as they might sell to, and in other ways showed his good will toward this competitor, which, in a facetious way, he had dubbed "the little pint cup rubber house."

In 1899 Mr. Converse had a nervous breakdown. Energetic and ambitious, he had worked for years without taking a vacation, and much of the time doing two or three men's work every day. The result was inevitable, and for three years he was obliged to remain out of business.

Having recovered his health, in 1902 he became the president of the Beacon Falls Rubber Shoe Co.'s distributing agency in Boston, and during the next six years was highly successful in building up the New England business for this new manufacturing firm.

As showing the perspicacity of George H. Lewis, then president of the Wales-Goodyear Co., when he chose Mr. Converse as the man to push his goods to the New England trade, he in-

sisted that the six-year contract should read that Mr. Converse should work but ten months out of twelve. Being a man of action, Mr. Converse demurred, but Mr. Lewis insisted on writing into the contract that he should keep away from business entirely during July and August of each year; that if at any time he attended to any details of business during those months, the contract should terminate.

In 1908 Mr. Converse determined to go into manufacturing on his own account, and established the Converse Rubber Shoe Co., building a small factory in the Edgeworth district of Malden, Massachusetts. His able management continued, and in the summer of 1916 the factory was greatly enlarged, more than doubling its capacity, and yet the demand for its goods was even greater than the factory could supply.

Mr. Converse is a man of quiet, forceful manner, with a wealth of original ideas, as is proved by his progress in the line to which he has devoted the greater portion of his business life.

PERSONAL MENTION.

Jesse E. La Dow, of the Mansfield Tire & Rubber Co., Mansfield, Ohio, is on the briny deep on his way presumably to the Far East; at least he wrote from Yokohama in November, having left Vancouver 15 days before on the Empress of Japan. The story of the memorable trip published in the "Mansfield News" is most interesting. However, one statement is, to say the least, remarkable. He says: "Our steamship was in sight of the Azores." Pretty far sighted to see the Azores from the Northern Pacific!

Mr. La Dow does far better, however, in a letter from Japan to the "New York Herald." There he cites the wages of the Japanese factory workers which are only one-tenth of what they are in the United States; in fact, constitute the lowest factory wages in the world. When the big Japanese rubber mills get into rubber lines where labor is the biggest factor, competition will be difficult, to say the least.

The many friends in the trade of Robert B. Baird, vice-president of the Rubber Trading Co., will be glad to learn that he has returned to his desk. Robert L. Baird has just returned from a trip to Cuba.

Gove & French, Inc., New York City, announce that Walter H. Bass is now associated with the company.

Mr. and Mrs. George W. Ryan, of East Orange, New Jersey, announce the engagement of their daughter, Miss Helen Hathaway Ryan, to Collier W. Baird, son of Mr. and Mrs. William T. Baird, and assistant treasurer of the Rubber Trading Co., 9-15 Murray street, New York City. Mr. Baird is a graduate of Yale Sheffield, class of 1910, and is a member of the Yale and Essex Country Clubs and of Essex Troop, with which he recently served on the border.

Rawson R. Cowen, son of the late Robert Cowen, has been added to the selling force of the New Jersey Rubber Co., Lambertville, New Jersey, rubber reclaimers, and will travel in New York, New Jersey and Pennsylvania.

O. D. Garretson, secretary and treasurer of the Electric Hose & Rubber Co., is president of the Manufacturers' Association of Wilmington (Delaware), also of the Employers' Association, and takes an active and enthusiastic interest in all matters making for the betterment of Wilmington as an industrial and home center.

Richard Weil, manufacturers' agent, well known in the East Indian crude rubber trade, has returned to the Far East after a two weeks' business sojourn in the United States. He expects to return to New York in June, 1917.

F. G. Hettell, having been associated with Parker, Stearns & Co., druggists' sundries manufacturers, Brooklyn, New York, as superintendent for over 25 years, has resigned to take effect January 1, 1917.

THE MANAGER OF THE "CANADIAN CONSOLIDATED."

J. A. WADE, who has recently been appointed manager of the Montreal factories of the Canadian Consolidated Rubber Co., Limited, is a man of wide rubber knowledge, 20 years' experience, and so particularly well equipped to weld together the several factory units in Montreal under the supervision of a



J. A. WADE.

central authority constantly in touch with the mills. His varied associations have embraced not only many of the manufacturing departments of the Dominion Rubber System, but both the factory and sales departments of a prominent rubber firm in the United States.

In 1895 he entered the employ of the Revere Rubber Co., Chelsea, Massachusetts. After four years' training in the factory he was transferred to the sales division to be-

come familiar with costs, selling methods and general office routine. There he remained four years more and then went on the road selling general rubber goods. Later, hearing of contemplated changes at the plant of the Canadian Rubber Co., of Montreal, he arranged to join the staff as assistant manager of the mechanical rubber goods division, and since that time has been associated with the mechanical line except during 1912 and 1913, when he was general superintendent of the B. & R. Rubber Co.'s factory at North Brookfield, Massachusetts.

Mr. Wade not only knows rubber manufacture well, but he has a keen insight of human nature. His success is due, in large measure, to constructive organization of the force under him. Superintendents, foremen and the operatives generally have confidence in his leadership and feel safe in his hands. That efficiency in every detail is to be encouraged may be seen in the weekly meetings of the foremen of his various departments, at which ways and means to improve the service are discussed. With the able assistance of Messrs. F. Jamieson and Henry Poole, superintendent and assistant superintendent, respectively, Mr. Wade's regime promises to be notable.

PAN-AMERICAN AERONAUTIC EXPOSITION.

New York is to have an aeronautic show. The first Pan-American Aeronautic Exposition will be held in Grand Central Palace, February 8 to 15, under the joint auspices of the National Automobile Chamber of Commerce, the Aero Club of America, the Pan-American Aeronautic Federation and the American Society of Aeronautic Engineers. Howard E. Coffin, of the Hudson Motor Car Co., is chairman of the Exposition.

Details have not been completely worked out, but it is probable that the motor and accessory manufacturers will participate. The Society of Automobile Engineers has extended its activities to include aeronautics, and will hold a technical session during the exposition for the discussion of present developments and possibilities of airplane engines. The S. A. E. standards committee is being reorganized in order to carry its work of standardization into the aeronautic field.

JUDICIAL DECISIONS.

BUFFALO SPECIALTY CO. V. INDIANA RUBBER & INSULATED WIRE CO. The case here reported was an appeal from the District Court of the United States for the District of Indiana, the appellant having brought suit to restrain infringement of all the claims of patent No. 578,551, granted to E. C. Duryea, March 9, 1897, for improvements in vehicle tires.

The device of the patent consists in a pneumatic tube or bicycle tire treated internally with a semi-liquid compound which, when a puncture occurs, is forced by the action of the compressed air within the tube into the aperture, and upon becoming exposed to the air thereby congeals and thus repairs the leak. The fluid, known as "dope," was not patented and, according to the patentee of the tube, may consist of any liquid or semi-liquid which will retain its free-flowing characteristics while contained within the tube, but will coagulate when exposed to the external atmosphere.

Infringement was based upon the following facts: The appellant was engaged in manufacturing and selling "dope"; the defendant, in making and selling pneumatic bicycle tires. The latter, being on November 5, 1898, the owner of the patent in suit, sold and conveyed it to the appellant's predecessor in title, the Buffalo Specialty Manufacturing Co., and took back, as a part of the transaction, what was in the transfer agreement termed "a shop license under said letters patent," granting the right to manufacture and use the dope, but withholding the right to its manufacture for sale except in a local retail way from the factories of the Indiana Rubber & Insulated Wire Co., and Peoria Rubber & Manufacturing Co., respectively. The appellee thereupon proceeded to manufacture the doped tire for over 11 years, when the business with the Chicago house of Sears, Roebuck & Co. attained immense proportions.

The appellant's contention was that it had no knowledge of the action of the appellee in building up such a large trade until about the time of the suit; that such action was in violation of the shop agreement, the true intent of which, it claimed, was that the appellee should make and use or make and sell the invention only in a local retail way from its two factories.

At the time this suit was begun the appellee also brought suit in an Indiana State Court for reformation of the contract or shop license; also for an injunctive relief, and damages. No complaint was made of the sale of "dope" as such, but only of its sale as an element of the tire of the patent.

The court dismissed the bill at the appellant's cost for want of equity, a decision which was afterward affirmed on appeal. This decision was pleaded as *res adjudicata* (a matter already settled).

The appellant's claim of infringement was based upon the proposition that the appellee, having breached the license contract by making and selling the device of the patent in quantities, became an infringer. The District Court sustained both non-infringement and the plea of former adjudication, and dismissed the bill for want of equity. This action of the District Court was assigned for error.

The Circuit Court of Appeals, Seventh District, before which the appeal for assignment for error came, held that the shop license authorized the defendant to manufacture in unlimited quantities tires with the patented device, the only restriction being upon the sale of the dope; this being particularly true in view of the fact that there had been a long acquiescence in the defendant's manufacture of tires. [The Federal Reporter, Vol. 334, pages 334 to 336.]

L. A. Watts, for three years manager of The Republic Rubber Co. of Texas, has been appointed general factory purchasing agent, with headquarters at the main plant, Youngstown, Ohio. R. E. Ratcliffe, for two years in charge of mechanical sales at The Republic Rubber Co. of Texas, succeeds Mr. Watts.

TRADE NOTES.

The United States Rubber Co. has acquired the business of the McCord-Norton Co., St. Joseph, Missouri, which will be continued under the same name as a branch store of the first-named company.

The recent fire at the Philadelphia (Pennsylvania) plant of The Barrett Co. was confined to one department, the loss being approximately \$25,000, fully covered by insurance. Plans for rebuilding have been prepared and the work will be completed and new equipment installed within 60 days.

The Cravenette Co. has been obliged, on account of increased business, to move to larger quarters on the seventeenth floor of the Hess Building, 354 Fourth avenue, New York City.

Extensive additions are being made to the Granby, Quebec, factory of the Canadian Consolidated Rubber Co., Montreal, Canada.

Eastern factories are so congested with orders that the Portland Rubber Mills, Portland, Oregon, has been asked to bid on an order for 3,000,000 small rubber washers. Incidentally this shows to what extent this practical little rubber device is used.

The Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pennsylvania, has established a bonus system for its salaried employes, similar to that which has been in operation for some time among wage earners. The bonus, paid monthly, is 8 per cent, provided absences and tardiness do not exceed six hours, or more than three occasions. Those who have lost no time receive an additional 4 per cent.

A new warehouse of reinforced concrete with outside walls of solid pressed brick, has been added to the Regina (Saskatchewan) branch of the Canadian Consolidated Rubber Co., Limited. The building is designed for five stories and basement, but has for the present two stories and basement. It is 50 by 100 feet wide with a loading platform 50 by 13 feet, facing the railway spur track, and contains all the latest improvements. The Dominion rubber factory of this company at St. Jerome, Quebec, is also being enlarged to meet the increased demand for "Fleet Foot" shoes.

Owing to constantly increasing business in its surgeon's gloves, the Halifax Rubber Co., Halifax, Pennsylvania, is enlarging its plant and installing new machinery and equipment.

The Philadelphia (Pennsylvania) office of the Goodall Rubber Co., Inc., is now located at Eleventh and Race streets, and the New York City office and warerooms at 72 Murray street. These changes afford three times the former wareroom space in both cities.

The Habirshaw Electric Cable Co., 10 East Forty-third street, New York City, has let a contract for the construction of a two and three-story addition to its manufacturing plant at Yonkers, New York, 200 by 300 feet.

The Electric Cable Co., Bridgeport, Connecticut, has awarded a contract for a four-story addition 57 by 130 feet.

Mulconroy Co., Inc., has removed to more commodious quarters at 528 Fourth avenue, Pittsburgh, Pennsylvania, where a full stock of the Mulconroy line of hose, "7-League" sewed leather-soled rubber boots, etc., will be carried.

Owing to the restriction of imports during the past year, there has been an unusual development of the chemical industries in the United States. There has been a large increase in the number of by-product coke plants which are utilized in the production of many compounds formerly imported from Germany. The products referred to include the following that are used in the rubber industry: benzol, solvent naphtha, toluol, carbolic acid, and cresylic acid.

The Court of Appeals has ordered L. G. De Cant to pay for the \$1,000 worth of stock in the C. A. White Rubber Co., Watertown, New York, which he subscribed for but never received, the money to go to the creditors in bankruptcy of the company. This case has been in the courts for a number of years.

K. V. Hawby, a Dane, and his brother, Axel S. Hawby, having pleaded guilty to shipping dental rubber as passengers' baggage on Scandinavian-American liners, were recently sentenced to ten days in the Tombs, theirs being the first prison sentences to be imposed on shippers who violated United States customs laws in attempts to run the British blockade.

The Merchants' Association of New York has just issued an important pamphlet opposing government ownership and operation of public utilities, and advocating exclusive regulation of all railroads by the Federal Government. It presents a masterly summing up of logical arguments that the Association's Committee on Transportation will support before the Newlands Commission, which is about to begin an investigation of this entire matter.

The Republic Rubber Co., Youngstown, Ohio, recently received an order for railway hose the volume of which doubles the amount of this class of business that the company has had for years.

Work has been commenced on the addition to the plant of the New York Rubber Co., Beacon, New York. The new building will be two stories high and 50 by 100 feet.

The Kelley Rubber Co., Cleveland, Ohio, will increase its output as soon as a suitable factory building can be located.

The Goodall Rubber Co., Inc., Philadelphia, has moved to larger quarters in the Commercial Building at Eleventh and Race streets. For a number of years it has been located at 19 North Seventh street.

A Zanesville, Ohio, brick company recently closed a contract for 20,000,000 bricks to be used for additions to Akron rubber factories.

A new rubber factory devoted to the manufacture of druggists' sundries and toys is projected by C. V. Martin, of Newcastle, Pennsylvania, to be located at Norwalk, Ohio, in the very early future.

Work is being rapidly rushed on the buildings of the Brunswick-Balke-Collender Co.'s factories in Muskegon, Michigan. Machinery installation is expected to commence January 1.

The Millbury Rubber Co., Millbury, Massachusetts, notice of whose incorporation appears elsewhere in this issue, has taken over the plant of the Stoddard Rubber Co., Inc., at Millbury, the latter company having discontinued business. The Millbury company manufactures four sizes of non-skid tires. The present capacity of the mill is 160 tires a day, and it is planned to increase this shortly to 300.

The fiftieth anniversary of the founding of The Loewenthal Co., Chicago, Illinois, will be celebrated on New Year's Day. This well-known waste rubber concern operates extensively throughout the country and also carries on a large export and import business.

Kaufman & Rosenberg, dealers in scrap metals and rubber, have moved to 2994 Park avenue, New York City, where they occupy a three-story brick building, provided with the latest equipment for rapid and efficient shipment.

Wallace L. Gough & Co., dealer in crude rubber, gutta percha and balata, has joined offices with Richard Gough, Corn Exchange Bank Building, 11-19 William street, New York City, with A. T. Mason as associate.

AMAZON TIRE EXPANSION.

The Amazon Tire & Rubber Co., Akron, Ohio, has appointed Owen Moynihan as eastern district manager with headquarters in New York City. Among the recent additions to the staff of Amazon dealers may be mentioned Ralph E. Becker, Buffalo, New York, and the Strong, Carlisle & Hammond Co., Cleveland, Ohio.

INDEPENDENT RUBBER CO., LIMITED.

In THE INDIA RUBBER WORLD of December 1, 1916, was published an account of the formation of a new corporation, the F. E. Partridge Rubber Co. In that notice it was stated that this corporation had leased the factory of the Independent Rubber Co., at Merritton, Ontario. This is not the fact. The Partridge Company has leased the plant of the Independent Tire Co., at Guelph, Ontario.

The Independent Rubber Co., Limited, at Merritton, has not discontinued business, nor has it leased its factory. On the contrary, it is running to full capacity on orders, the demands for its rubber footwear having become so great that the management has recently been obliged to decline business.

S. A. E. EXTENDS ACTIVITIES.

The Society of Automobile Engineers, whose scientific investigations and standard specifications have done so much for the advance of the automobile industry, has extended its activities to the aeronautic, tractor and motor boat fields. The recently established Buffalo section will devote considerable attention to this work, and the newer activities are prominently reflected in the program of papers to be read at the annual meeting of the society, to be held in New York City, January 11, at the time of the automobile show. During the First Pan-American Aeronautical Exposition, to be held at Grand Central Palace, February 8 to 15 inclusive, a technical session of the society will also be held.

NEW PLANT OF THE HENRY L. SCOTT CO.

The Henry L. Scott Co., Providence, Rhode Island, builder of precision testing machines for rubber, cotton fabric, cords and other materials, has recently occupied its new factory at Blackstone and Culver streets. As shown by the accompanying illustration, the plant consists of a two-story building of heavy mill construction with basement 35 by 68 feet; a boiler house 18 by 35 feet in the rear; and a storehouse 22 feet square at one side.

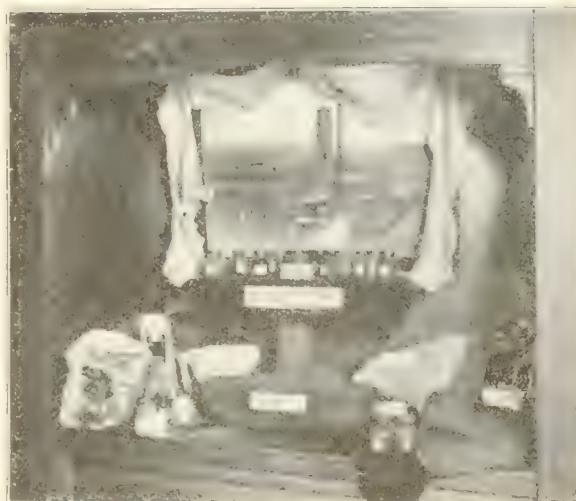
The main building is equipped with sprinklers and safety devices throughout. Exceptionally large windows have been



provided and the shop is otherwise well lighted, both gas and electricity being employed. All machinery is operated by electric motors and materials are carried from floor to floor by an electric elevator. The first floor is devoted entirely to the manufacture of machine parts. Castings and raw stock are stored in the basement, and the snagging and painting are also done there. On the top floor are located the offices, drafting room, assembling and shipping departments. Visitors interested in the testing of materials and the obvious advantage of buying and selling them by specification are welcome.

ROSENWALD & WEIL ARE PROGRESSIVE.

The accompanying illustration was made from a photograph showing a portion of the exhibit that was recently held in the Chicago showrooms of Rosenwald & Weil, maker of rubber



products and rubberizers of all kinds of fabrics. There were shown the raw materials, such as crude rubber, chemicals, compounding ingredients, and fabrics used in the manufacture of the various products made in the Chicago plant, a picture of which was appropriately draped with a sheet of the best plantation crêpe rubber.

In addition to the complete line of rubber clothing, there was shown a variety of rubber specialties, including "Imperial" sheeting, piano bellows cloth and rubber cement, made by this company and distributed by their selling force all over the world.

DRY CLIMATE TIRE COMPANY MEETING.

At the annual stockholders' meeting of The Dry Climate Tire Manufacturing Co., Arvada, Colorado, held December 2, 1916, the following directors were elected: E. A. Austin, president, Boulder, Colorado; W. J. H. Doran, president Denver Manufacturing Association; George P. McKenney, Denver, Colorado; R. S. Van Tassell, Cheyenne, Wyoming; C. H. Allyn, Hardin, Colorado; Daniel A. Lord, Denver; J. F. White, Arvada.

The auditors' report showed a substantial profit, indicating future dividends. The purchase of additional equipment of molds, presses and vulcanizers was authorized to increase production in accordance with present demands.

THE BUCYRUS RUBBER CO.

At a stockholders' meeting of The Bucyrus Rubber Co., Bucyrus, Ohio, on December 4, the following directors were elected: George Donnenwirth, W. A. Blicke, A. G. Stoltz, H. A. Paxton, A. J. Richards, Phil. Browassky, Phil. Heater, William Schwenck, and Jacob Colter. On December 8, the directors met and elected the following officers: Phil. Heater, president; George Donnenwirth, vice-president; W. A. Blicke, treasurer; C. P. Mader, secretary. The affairs of the company were reported to be in good condition, and it is anticipated that business for next season will be greatly increased.

POST ACQUIRES BANNER RUBBER SHOE PLANT

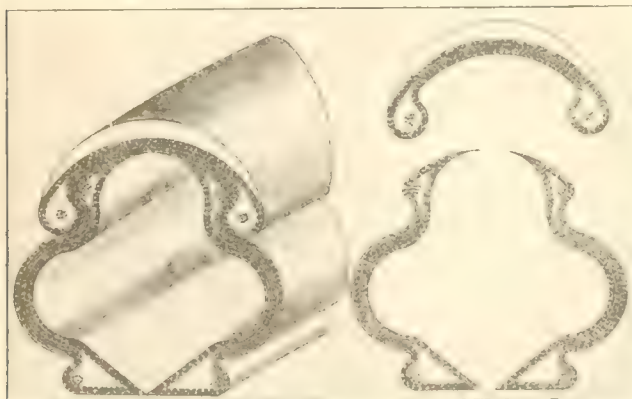
The plant of the old Banner Rubber Co., St. Louis, Missouri, which has been idle since that firm's retirement from the rubber shoe business several years ago, has been acquired by the Post Tire & Rubber Corporation, of New York City, and will be opened at once with a large force. The factory has a floor space of 70,000 square feet and a daily capacity of 1,200 automobile tires and 15,000 pairs of rubber boots and tennis shoes.

TIRE PRICES MAY BE ADVANCED.

FOLLOWING the rise of about 12½ per cent. in tire prices early last year is now seems probable that prices will soon be advanced again from 15 to 20 per cent. Dealers usually order heavily about this time for spring delivery, and the fact that two of the largest manufacturers have instructed their agents to accept only orders for immediate shipment seems to foreshadow a general advance. This refusal of forward orders is due to the unsettled conditions affecting crude material prices. In this connection it is a somewhat apomalous fact that every production cost, including compounding ingredients and labor, has long since advanced greatly, except rubber itself. Until October rubber had actually been a little lower than a year ago, but during the past three months the trend of the market has been upward to an advance of about 20 per cent. Tire building fabric now sells at about double the prices prevailing a year ago. Oxide of zinc, lampblack and all compounding ingredients are relatively high, and whiting has nearly doubled in cost, so that on the present price schedule the margin of profit in tire manufacture is small.

A THREE-SECTION AUTOMOBILE TIRE.

A pneumatic tire that differs radically from the ordinary casing and tread construction, is the subject of the following illustration and description. This tire has two separate side walls while the tread is a separate section, as will be seen by referring to the figure on the right. The conformation of the



outer ends of the two side walls and both sides of the tread is such that when assembled with the inner tube, a few pounds' inflation suffices to lock the sections firmly together.

Among the advantages claimed for this novel construction are greater protection to the tube, and danger of punctures and blow-outs minimized. The tread is readily interchangeable, as the side walls of a given size are identical; moreover, the tread may be used on any corresponding standard tire, making the retreading of a worn-out tire a very simple matter. It is also apparent, from the inventor's claims, that when the sectional tire becomes hopelessly worn or damaged, in the great majority of cases, it will be necessary only to replace one-third of the tire to make it serviceable again. [D. C. Roberts, Trenton, New Jersey.]

ASBESTOS FOR TIRE FABRIC.

Long-fibre asbestos spun into thread has been suggested and even used to a certain extent as a substitute for cotton in the manufacture of tire fabric. While some experts hold to the opinion that it cannot have the tensile strength of cotton fabric, its possibilities in connection with an unusually broad breaker strip of woven wire extending about the side walls are particularly interesting at a time when the Egyptian cotton crop is restricted; the Sea Island crop is threatened by the ravages of

the boll weevil; the total American cotton crop is nearly 3,000,000 bales below normal; and the cotton demand for miscellaneous purposes is unprecedented. The breaker strip referred to is composed of fine wire, bound with asbestos, woven into fabric and rubberized. Time will substantiate the sweeping claims of superiority based upon strength and nonconductivity of heat if they be well founded. Meanwhile, it is certain that mineral asbestos is not rotted by moisture percolating through cuts in the tire tread and carrying along some of the sulphur of vulcanization. Herein, perhaps, lies its chief claim to notice as a possible substitute for cotton tire fabric.

AUTOMOBILE ACCESSORY WEEK.

THE seventeenth Annual National Automobile Show under the auspices of the Motor and Accessory Manufacturers will be held at Grand Central Palace, New York City, January 6 to 13, and at the Coliseum and First Regiment Armory, Chicago, January 27 to February 3. More than 340 exhibitors have been allotted space, most of them at both shows. In this list of exhibitors are the following names which are familiar to readers of THE INDIA RUBBER WORLD:

Adamson & Co., Inc., New York City.
 Asch & Co., Inc., New York City.
 Brunswick-Balke-Collender Co., New York City.
 Cutler-Hammer Manufacturing Co., Milwaukee, Wisconsin.
 Eastern Rubber Co., Philadelphia, Pennsylvania.
 Essex Rubber Co., Trenton, New Jersey.
 Eureka Rim Compressor, Inc., Addison, New York.
 General Tire & Rubber Co., Akron, Ohio.
 Hill Insulating & Manufacturing Corporation, New York City.
 Mattson Rubber Co., Lodi, New Jersey.
 Mutty, L. J. Co., Boston, Massachusetts.
 Pittsburgh Electric Specialties Co., New York City.
 Rubber Insulated Metals Corporation, Plainfield, New Jersey.
 Western Electric Instrument Co., Newark, New Jersey.

There will be 98 cars exhibited, while 218 accessory manufacturers will display their lines. Many elaborate arrangements and novel effects are being planned for this exhibition.

SOCIETY OF AUTOMOBILE ENGINEERS.

The week in New York City will be a busy one. The Society of Automobile Engineers, which now has 370 members, will hold its annual meeting during the week. On Tuesday there will be a preliminary session of the Standards Committee. The regular business meeting will be held Wednesday, at which officers will be elected and proposed constitutional amendments discussed. The afternoon session will be devoted largely to aviation subjects. Thursday will be given over to professional papers and discussion of automobile subjects. A buffet luncheon will be served at noon. This meeting will be held at the Engineering Societies Building, 29 West Thirty-ninth street.

The annual banquet will be held at the Hotel Biltmore, Thursday evening. Three short addresses on subjects of interest to the automobile industry will be important features. The 750 diners in a body will then attend a midnight theatrical performance as a climax to the function.

MOTOR AND ACCESSORY MANUFACTURERS.

The Motor and Accessory Manufacturers, which now number 260 members, will hold their thirteenth annual meeting at the Waldorf-Astoria Hotel, New York City, Wednesday, January 10 at 3 o'clock, following this with the Ninth Annual Banquet at the same hotel at 7:30 P. M. An efficient banquet committee is in charge, and the affair promises to be the banner occasion of this association. On Thursday, January 11, the board of directors will hold an important meeting at the offices of the association.

NEW INCORPORATIONS.

Batterman, Rood Rubber Co., The, October 24 (Massachusetts), \$150,000. John J. Batterman, 95 Newbury street, Boston; Warren B. Rood, 585 Franklin street, Melrose Highlands; Robert W. Daniels, 16 Harrison street, Brookline; Thomas H. Dumper, 15 Fernwick Road, Winchester—all in Massachusetts. To manufacture and deal in shoes, clothing, etc., made in whole or in part from rubber or other similar materials.

Beacon Rubber Co., Inc., December 13 (New York), \$50,000. Herbert T. Auerbach, Statler Hotel; Harold A. Forbes, 241 Maryland street, and L. B. Dietz, 40 Laurel street—all in Buffalo, New York. To manufacture rubber goods, etc.

Bering Tire & Repair Co., November 24 (Texas), \$20,000. A. C. Bering, Jr., John W. House and Hamblen Pattison—all of Houston, Texas. Principal office, Houston, Texas. To deal in tires. This company succeeds the Bering Tire & Rubber Co.

Colton Demountable Rim Corporation, December 12 (Delaware), \$2,500,000. L. R. Sheldon and L. N. Downs, New York City, and George H. Roeder, Brooklyn, New York. Principal office, United States Corporation Co., Dover, Delaware. To manufacture and deal in rims for automobiles, especially the Colton Demountable Rim.

Goshen Rubber & Manufacturing Co., October 25 (Indiana), \$5,000. Charles Noel (president and treasurer), Henry W. Pease (secretary and sales manager), and John Lash. Principal office, Goshen, Indiana. To manufacture mechanical rubber goods, rubber molds and machinery.

Guarantee Tire & Rubber Co., November 4 (Indiana), \$70,000. G. F. Kreitlein (president); C. W. Minesinger (vice-president), Walter W. Kuhn (secretary). To deal in casings, tubes and accessories.

International Rubber Sales Co., November 1 (Indiana), \$10,000. Marc Wile, Leah Wile, and Alex D. Rodgers, Jr. Principal office, Evansville, Indiana. To buy, sell and repair automobile tires and accessories.

Interstate Elastic Braid Co., Inc., December 6 (New York), \$5,000. Samuel Sagor, 336 First street, Brooklyn, New York; David G. Herman and Charles Herman, 126 East Twelfth street, New York City. To manufacture elastic braid.

Lapp Insulator Co., Inc., December 14 (New York), \$150,000. John B. Abbott, Geneseo; Harlan W. Rippey and Samuel Levy, Rochester—both in New York. Principal office, LeRoy, New York. To manufacture electrical apparatus, insulating materials, rubber, etc.

Marine Rubber & Chemical Co., Inc., The, December 9 (New York), \$1,000. James B. Pelton, 197 Penn street; Richard Murphy, 540 Fifty-seventh street—both in Brooklyn, New York, and Frank A. O'Rea, 6 Mangin street, New York City.

Metallic Auto-Tire Co., November 1 (Massachusetts), \$500,000. Constantine P. Govostos, 355 Harrison avenue, Boston; Joseph Lazarus, 25 Sea Foam avenue, Winthrop, and Alexander O. Szeitz, 53 Piedmont street, Worcester—all in Massachusetts. Principal office, Lynn, Massachusetts. To manufacture and deal in metallic tires, automobiles, etc.

Millbury Rubber Co., November 15 (Massachusetts), \$90,000. Albert W. Blackmer, J. Otis Sibley, and Ruth E. Price—all of Worcester, Massachusetts. Principal office, Millbury, Massachusetts. To manufacture and deal in all kinds of crude rubber or rubber compounds, tires, and articles made of rubber and other compounds.

Parker Collapsible Rim Corporation, August 23 (Delaware), \$3,000,000. Lawrence Angel, Cedarhurst, Long Island, New York; George J. Soden, 386 One Hundred and Sixty-first street, New York City; Sidney S. Lesser, 1935 Bergen street, and Louise Frankel, 592 Decatur street—both in Brooklyn, New York. Principal office, Delaware Charter Guarantee & Trust Co., 328 du Pont Building, Wilmington, Delaware. To manufacture and deal in rims, parts and appliances in connection with automobiles and other motor vehicles.

Quick Lock Demountable Rim Co., November 14 (Massachusetts), \$50,000. James Norrie, 78 Chauncy street, Charles F. Crowell, Room 22, Ames Building—both in Boston, Massachusetts, and James W. Stevens, 9 Summit avenue, Brookline, Massachusetts. Principal office, Boston, Massachusetts. For the purpose of holding, buying, selling and dealing in patents and patent rights and automobile accessories.

Reuter Rubber Co., November 9 (New Jersey), \$250,000. George Joseph Reuter, 182 Montclair avenue; Alfred Strauss, 75 Hedden Terrace, and Frederick Seligman, 202 Fifth street—all in Newark, New Jersey. Principal office, 11 Clinton street, Newark, New Jersey. To manufacture and deal in tires and tubes.

Rubber Pachit Corporation, December 18 (New York), \$30,000. Frederic W. Rogers and Edward Goldfarb, 40 Exchange Place, and V. C. Bogardus, 140 Nassau street—both in New York City. Vulcanizing materials, tire repairing, etc.

Scientific Rubber Heel Co., Inc., December 8 (New York), \$200,000. William H. Arrington, 619 West One Hundred and Thirty-fifth street, New York City; Blanchel A. Murrelle, 1716 Caton avenue, and Ellis S. Helwitz, 1129 East Fifteenth street—both in Brooklyn, New York.

Servis Tire & Tube Co., December 1 (Delaware), \$100,000. F. D. Buck, George W. Dillman and M. L. Horthy—all of Wilmington, Delaware. Principal office, Delaware Charter Guarantee & Trust Co., 328 duPont Building, Wilmington, Delaware. To manufacture and sell tires and tubes.

Standard Tire Valve Co., September 13 (Massachusetts), \$100,000. Michael F. Clarke and John Luther, 40 Central street, and John W. McCormack, Tremont Building—both in Boston, Massachusetts. Principal office, Boston, Massachusetts. To build, construct, manufacture and deal in tire valves, etc.

Triple Airless Tire Co., September 21 (Delaware), \$150,000. Andrew C. Heilman, Butler; J. M. Martin and F. W. Daugherty, Grove City—both in Pennsylvania. Principal office, Colonial Charter Co., 927 Market street, Wilmington, Delaware. To manufacture and deal in the Triple Airless tires, and other tires and rubber goods.

Tu-Shu-Tire Corporation, December 13 (New York), \$5,000. William C. Moore, 1178 Broadway; William P. Herrick, and Gerard P. Herrick, 61 East Seventy-third street—all of New York City.

United States Rubber Co., December 7 (Delaware), \$100,000. Henry B. Hubbard, 1540 Seventy-second street; John D. Carberry, 822 Greene avenue—both in Brooklyn, New York, and George H. Mayo, 159 Corlies avenue, Pelham, New York. Principal office, Corporation Trust Co. of America, 394 duPont Building, Wilmington, Delaware. To purchase, sell and deal in goods, wares and merchandise of which rubber is a component part. This company was organized to operate the business heretofore carried on by certain branch store selling companies in various parts of the United States.

Wayne Tire & Rubber Co., November 3 (Indiana), \$3,000. W. R. Britton, H. T. Whitney, E. J. Wohlfeld. Principal office, Indianapolis, Indiana. To deal in tires, accessories, etc.

FINAL SETTLEMENT OF THE PERLMAN RIM SUIT

Through the payment of \$1,010,000 by the Standard Welding Co., Cleveland, Ohio, to the Perlman Rim Corporation, in settlement of back royalties, the famous Perlman rim suit, referred to in several previous issues of THE INDIA RUBBER WORLD, has been virtually closed, although certain legal formalities still remain to be complied with. Thus the last Stanweld debt to Perlman has been paid and the plant will henceforth manufacture rims under a Perlman license. The factory space is to be enlarged next summer to about 1,600,000 feet.

Of value for daily reference in every rubber office.—"The Polyglot Rubber Trade Directory, 1916."

PERSONAL MENTION

John Kearns has been elected general manager of the Lee Tire & Rubber Co., Conshohocken, Pennsylvania, in full charge of manufacturing, and plans are being made for a material increase in the production and capacity of the plant under his management. Formerly Mr. Kearns was vice-president of The Fisk Rubber Co., Chicopee Falls, Massachusetts, and previous to that he organized the British Dunlop Co. of Australia, with which he was connected for 12 years.

W. M. Pound succeeds Millard Ritter as local manager of the Charlotte (North Carolina) depot of The B. F. Goodrich Co., Akron, Ohio.

E. Duffy has joined forces with the Kelly-Field Co., selling agency for the Lee Tire & Rubber Co., Conshohocken, Pennsylvania, and hereafter will devote his experienced attention to the merchandising of Lee tires. He was formerly sales manager of the Midgeley Tire & Rubber Co., and prior to that was connected with the Hartford Rubber Works Co.

H. R. Platt, recently with the Batavia Rubber Co., has been appointed assistant superintendent of the tire department of The Gordon Tire & Rubber Co., Canton, Ohio.

J. F. Thompson has been appointed general district manager of the New York branch of the Sewell Cushion Wheel Co., Detroit, Michigan.

J. D. Cary has been promoted to the position of southern district manager for the Kelly-Springfield Tire Co., New York City. Mr. Cary was formerly manager of the Atlanta (Georgia) branch, where he is succeeded by Amos W. Whaley.

George M. Martin is in charge of the new branch of the Kelly-Springfield Tire Co. at Minneapolis, Minnesota. For the past eight years Mr. Martin was connected with the Firestone Tire & Rubber Co., Akron, Ohio, as manager, respectively, of its Omaha, St. Louis and Minneapolis branches, and therefore brings a wealth of experience to his new position.

R. W. Llewellyn has been placed in charge of the branch store and wholesale depot recently opened at Columbus, Ohio, by the Kelly-Springfield Tire Co.

R. C. Bubb, of Grimley, Limited, agents for the Firestone Tire & Rubber Co., at Sydney, Australia, recently returned from an extended visit to the United States for the purpose of studying factory and export conditions. Mr. Bubb states that, although a part of the British Empire, Australia buys most of its automobiles, tires and motor car accessories from the United States.

A. E. Hertzog has been made manager of the Washington, D. C., branch of the Goodyear Tire & Rubber Co., Akron, Ohio. He was formerly employed as manager of the Baltimore branch and will now take charge of both territories. L. J. Gemmil, former manager of the Washington branch, will devote his time to looking after the government business.

George M. Stadelman, vice-president of the Goodyear Tire & Rubber Co., Akron, Ohio, is now in South America with his family. While the trip is taken mainly for recuperation, Goodyear interests in that region will doubtless claim a share of his attention.

G. W. Henne, general manager of the Mansfield Tire & Rubber Co., Mansfield, Ohio, has recently decided to turn over five acres of the company's ground to be devoted to garden purposes for the benefit of the employees. The company will plow, irrigate and supply seed for each employee who may desire to raise his own food stuffs.

Henry C. Plow, at one time treasurer of the Hartford Rubber Works, and more recently vice-president and sales manager of the Midgeley Tire & Rubber Co., has purchased and will operate the Automobile Owners' Accessory Co., Limited, of Montreal, Canada. The company will be renamed and reincorporated.

E. A. Jacob has become manager of the Portage Rubber Co.'s Des Moines (Iowa) branch. He succeeds J. W. Wildman, who has been transferred to the Chicago offices.

James G. Budd, of The Fisk Rubber Co., Chicopee Falls, Massachusetts, recently completed an 11 months' tour in the Far East, in the interests of the company's export and service department. Mr. Budd's successful mastery of about 20 different tongues and dialects peculiarly fits him for such an undertaking.

C. M. Folger, Pacific Coast manager of the Marathon Tire & Rubber Co., Cuyahoga Falls, Ohio, has been spending the last few weeks in the Hawaiian Islands, visiting Marathon distributors and gathering information on conditions in that territory.

WESTINGHOUSE TO INCREASE CAPITAL.

The Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pennsylvania, will increase its capital by the addition of \$15,000,000 of common stock, provided the recent resolution of the board of directors is authorized by the stockholders at a special meeting called for February 15. All plants of the company are doing capacity business and many profitable contracts have had to be declined. The new issue of stock will permit the immediate erection of a much needed plant at Essington, Pennsylvania, just outside of Philadelphia, at an expense of \$5,000,000 to \$7,000,000.

A WELL-KNOWN INVENTOR AT WORK.

TO see men in their offices is almost as interesting as to meet them in the flesh, and it is a pleasure occasionally to have an opportunity to show the daily surroundings of those who have contributed materially to the advance of rubber manufacture. The accompanying illustration shows Arthur Jackson Wills, the well-known inventor, in his office at North Brookfield, Massachusetts, explaining the model of one of his recent inventions to Mr. Lindholm of the Pneumatic Scale Corporation. Mr. Wills is a mechanical engineer of exceptional ability, and since his association with the B. & R. Rubber Co., of North Brookfield, Massachusetts, has devoted himself with marked success to the



OFFICE OF ARTHUR JACKSON WILLS

design and manufacture of special rubber machinery. Keen insight and a first-hand knowledge of the needs of the industry, coupled with a positive creative ability, have brought forth several time and labor-saving devices which have been adopted by leading rubber manufacturers in Europe as well as America. His automatic, carton filling machine was soon followed by a rubber overflow trimmer for rubber heels and other molded goods—his most widely known invention—while the device just recently placed upon the market is a rubber edging plaiter. It is known that more patents are pending, and it is reasonable to assume that in his future work Mr. Wills will round out a much broader sphere of helpfulness to the rubber trade.

TRADE NOTES.

The Keaton Tire & Rubber Co. has moved into larger quarters at 636 Van Ness avenue, San Francisco, California, the new two-story and basement quarters having three entrances and affording every convenience for proper service.

The Meyer Rubber Co. is erecting a plant at Massillon, Ohio, for the manufacture of automobile tires and tire accessories.

The Gillette Safety Tire Co., Eau Claire, Wisconsin, has increased its capital stock to \$1,000,000. Work is progressing rapidly on the plant, and it is expected that by March or April the capacity will be more than doubled. C. G. Race, formerly general manager of the Chicago branch, is now general sales manager at Eau Claire.

The Estabrook-McGraw Tire Co., 1646 Broadway, Denver Colorado, is a new distributing agency for McGraw tires in Colorado and extensive adjacent territory in the Rocky Mountain region.

The Marathon Tire & Rubber Co., Cuyahoga Falls, Ohio, has opened a new department for the manufacture of rubber and composition soles and heels, with Frank B. Rickaby in charge.

The Hester Tire & Rubber Co. has acquired a three-acre site in Delphos, Ohio, on the Fort Wayne division of the Pennsylvania Railroad and the Clover Leaf Route, and will there erect a series of modern two-story factory buildings, of brick and concrete construction. Each unit will be 50 by 150 feet and will contain approximately 15,000 feet of floor space. It is expected that part of the plant will be in operation by spring.

To facilitate the shipment and storage of its tires, the Savage Tire Co., San Diego, California, has added to the group of its factory buildings a warehouse of brick and steel construction. It is erected on the tracks of the San Diego & Arizona Railroad and will handle all the carload shipments, besides being used as a supplementary storehouse for raw materials and an overflow storehouse for finished tires.

The Good-Wear Rubber Co. has purchased for \$30,000, property comprising 1½ acres of ground centrally located in Elyria, Ohio. The existing buildings on this property, having a floor space of 25,000 to 30,000 square feet, will be remodeled very shortly, the company expecting to manufacture tires in the late spring or early summer.

The Porter Rubber Co., Salem, Ohio, has raised its capital stock from \$125,000 to \$250,000, because of increased business, the new stock to be taken by present stockholders. This company already has a new, modern factory with a capacity of 350 tires and a like number of tubes per day.

The Watson Suspension Wheel Co., Franklin, Pennsylvania, has raised its capital stock from \$50,000 to \$150,000. This company holds the patents for the Triple Airless tire, which is made under contract. The officers are as follows: J. M. Martin, Grove City, Pennsylvania, president; A. C. Hileman, vice-president; Fred W. Daugherty, secretary and treasurer.

The Fox-Senior Tire Co. has decreased the amount of its authorized capital of \$20,000 to \$10,000.

The assets and liabilities of The McClurg Rubber Co., Coshoc-ton, Ohio, have recently been taken over by the Midland Tire & Rubber Co., which will operate in the old McClurg company's building at Coshoc-ton. Three tires of different grades, including a cord tire, and also tubes, will be manufactured. Wilmer Dunbar will act as general manager.

The Batavia Rubber Co., Batavia, New York, has filed complaint with the Interstate Commerce Commission charging the Atlantic Coast Line Railroad, and connecting lines, with dis-

crimination in rates with respect to its articles of manufacture on shipments meant for so-called Southern Classification territory by way of Ohio River crossings. The complaint alleges that this discrimination extends to classes of tires as follows: First class, on pneumatic tires, in any quantity; second class on solid tires, any quantity; and, third class, on all others, such as tires in steel casings. The complainant asks the commission to order rates which will cause "a larger spread" between the carload and less than carload lots.

The Goodyear Tire & Rubber Co., Akron, Ohio, has also filed a petition for reclassification of freight rates on tires shipped via the Atlantic Coast Line and other railroads in the South.

The Mutual Film Corporation will equip all of its motor cars with a specially constructed non-skid tire which will write the name of Charlie Chaplin in the dust of the road three times for each wheel revolution. Between imprints of the name will be footprints of the world's champion foot-worker, on the shoe of the tire.

The Iowa Rubber Tire Co., of Bettendorf, Iowa, has recently purchased the plant formerly occupied by the American Can Co. for \$70,000. It is claimed that the company has signed three tire experts from Akron, Ohio.

The Good-Wear Rubber Co., Elyria, Ohio, is said to have commenced operating. It is estimated that the company will employ 150 men and make 300 tires and 200 tubes daily.

It is understood that the contract for erecting the Kelly-Springfield Tire Co.'s plant at Cumberland, Maryland, has been let for \$2,500,000. Building will commence March 1.

Production has begun in the newly-built pneumatic tire factory of the J. & D. Tire & Rubber Co., at Charlotte, North Carolina. George Knowles, a scientific rubber man with 16 years' practical experience in tire manufacturing, is superintendent.

At the annual sales conference of The McGraw Tire & Rubber Co., East Palestine, Ohio, December 6 to 9, S. L. Warner was appointed assistant sales manager, and R. J. Delavan, special representative. C. K. Whittaker, former Pacific Coast district manager, was made Pacific Coast district manager, with headquarters at San Francisco, California. There was a full attendance of district managers at the conference, and C. E. Miley, general sales manager, presided.

A certificate of authority to do business in Illinois has been issued to The Gordon Tire & Rubber Co., an Ohio corporation with a capital stock of \$600,000. The principal office in Illinois is located in Chicago.

EMPIRE RUBBER & TIRE CO.'S NEW PHILADELPHIA OFFICE.

The new home of the Philadelphia (Pennsylvania) branch of the Empire Rubber & Tire Co., of Trenton, New Jersey, is a large four-story and basement building centrally located at 810 North Broad street. One of the main reasons for erecting this new building was to improve the service end of the company's business, and the rear portion of the first floor, 20 by 86 feet, is given over to the service station, allowing plenty of room to run cars inside. Experts will be in charge of this department, capable of giving advice to patrons which will insure the greatest possible service from the tires.

The entire second floor is used for the stock room. It is equipped with four rows of tire racks, each 160 feet long and extending to the ceiling, three tiers high, and with accommodations for at least 10,000 tires, everything being arranged to facilitate the quick handling of stock. The storage room for the many varied products of the company is on the third floor, and a completely equipped repair shop in charge of expert tire men occupies the entire fourth floor. An electric elevator runs from the first to the top floor.

THE RUBBER TRADE IN AKRON.

By Our Regular Correspondent.

THE concentration of the American rubber industry in Akron has made possible a much larger growth than if it were scattered over a larger territory. For example, the extended research work carried on by the large and wealthy companies here has advanced the industry with phenomenal rapidity, affording as it does, ever new uses for rubber.

In 1910 the population numbered only 69,000, as compared with the 51,150 people now employed here in rubber manufacture. Although every variety of rubber goods is extensively produced, the tire industry is the main element. It is claimed that Akron manufactures over 70 per cent of all the automobile tires used in the world. The past year's production of tires totals over 11,522,650. Every factory is operating to full capacity and constant additions are being made to floor space and equipment, to meet the ever increasing demand. Taking these facts into consideration, over 20,000,000 tires is considered a safe prediction for 1917.

The taxable value of the great plant of The B. F. Goodrich Co. amounts to almost half of the total of \$43,896,440 placed upon the 168 industries located in Akron and Summit County. Just how the rubber manufacturing business dominates in Akron, and the immensity of it, is shown by the following valuations for the different companies:

The B. F. Goodrich Co.....	\$20,392,830
Goodyear Tire & Rubber Co.....	7,631,780
Firestone Tire & Rubber Co.....	4,964,980
Kelly-Springfield Tire Co.....	1,371,930
Miller Rubber Co.	1,121,910
Portage Rubber Co.....	331,880
Swinehart Rubber Co.....	459,270

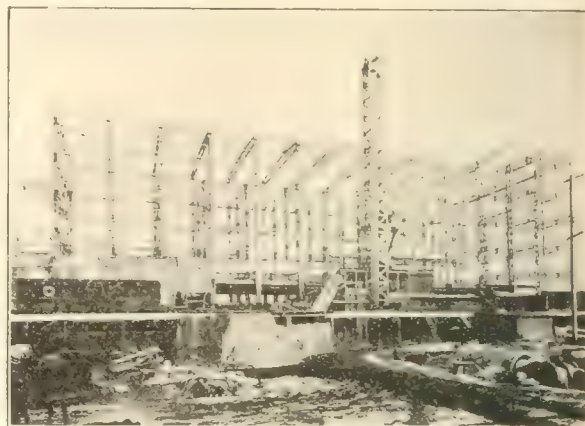
A total of \$36,220,580 is credited to the rubber manufacturing industry, more than four-fifths of the entire manufacturing activities of Akron and its suburbs.

Side by side with economic prosperity, social welfare for the benefit of the workers has flourished. The B. F. Goodrich Co. maintains a department of industrial relations, with divisions of labor, health and safety, including provision for illness, life insurance, recreation, etc. The splendidly equipped Firestone clubhouse has been previously described in these columns. The Goodyear Tire & Rubber Co. makes a specialty of athletics and also maintains a factory school. The Miller Rubber Co. has inaugurated an adjustment board among the employes of the employment department, allowing them to make minor adjustments of difficulties arising among workers. A well-equipped hospital has also been recently installed by the Miller company; an athletic field has been provided, all essential equipment for various sports being purchased by the company; and study clubs on practical business questions are being organized, with evening classes, including supper served by the labor department at actual cost.

* * *

For some time the Firestone Tire & Rubber Co. has been planning to enter the rubber footwear field, and a new department specially adapted to this line of manufacture is now in full swing. Extensive research undertaken by the company for a good substitute for leather soles—so prohibitive in cost at present—has resulted in the production of an entirely new line of fiber rubber soles and heels of sturdy quality which are now being offered to the shoe manufacturing trade. S. S. Patrick, formerly with the Beacon Falls Shoe Co., Beacon Falls, Connecticut, has been named as manager of footwear sales, and Harry D. Hamilton, formerly of the John H. Parker Co., Malden, Massachusetts, will act as footwear sales representative. P. D. Hammond is superintendent of the footwear factory. During the month of January, the complete line of footwear will be on display in Boston, Massachusetts, for the benefit of visiting buyers. The Firestone Tire & Rubber Co. is now aiming to produce

20,000 tires a day, and the accompanying illustration shows one of the new buildings in its process of expansion, designed to house all repair and mechanical departments. It is built of reinforced concrete and brick, with large steel-sash windows, and



ADDITION TO FIRESTONE PLANT.

contains approximately 86,000 square feet of floor space. Another separate building is also being erected and another story is being added to the main factory buildings.

The convention of branch managers of the Firestone company on December 12 to 14 was the first of its kind ever held. Office managers from 46 branches, traveling auditors and officials at the home office were all in attendance. The business sessions were held in the new clubhouse and there was much interesting discussion of business methods and conditions and a general exchange of ideas, which form so valuable a part of these get-together meetings.

President H. S. Firestone welcomed the visitors to the Akron office and delivered a short address. Other officers of the company who spoke during the convention were R. J. Firestone, vice-president; J. G. Robertson, treasurer; S. G. Carkhuff, secretary, and A. G. Partridge, general sales manager.

Arrangements were in charge of F. B. Dodge, branch organization manager, and the well-planned social program included a dinner in honor of the visitors at the Portage Country Club, banquets and theater parties; also a minstrel show, staged especially for the convention, and presented by the home office force.

President Firestone has been chosen as chairman of the Akron committee for the Rubber Club banquet to be held in New York City on January 8.

The Firestone Advertising Club has been formed by members of the advertising department and plans have been formulated for bringing to Akron prominent advertising men who will address the members on subjects of particular interest to the advertising fraternity. There are over 30 men in the Firestone advertising department, which numbers over a hundred people in all. Officers of the new club were elected as follows: F. K. Starbird, president; Don Bregenzer, vice-president; H. B. Garske, treasurer, and R. V. Cline, secretary.

* * *

The capital stock of the Punctureless Auto Tire Co., manufacturer of the King Tubeless tire, has been increased from \$100,000 to \$1,000,000. The company's plant is situated on 20 acres of land between Kenmore and Barberton. The main building is 60 by 300 feet and the power plant 36 by 100, two stories high. In the early spring two reinforced concrete and brick buildings 80 by 400 feet, four stories high, will be erected, orders for machinery for these large buildings having already been placed. Edward Hackathorn is president of the company.

* * *

The books of the Goodyear Tire & Rubber Co. show a remarkable record for the past year. Gross business jumped from

\$36,000,000 to \$63,000,000, an increase of 80 per cent over 1915, and net earnings for last year were \$7,000,000 as against \$5,000,000 for the preceding year. The comparative table of the business for the two years is as follows:

	1916.	1915.
Sales	\$63,950,400	\$36,490,652
Net earnings	7,003,330	5,137,083
Preferred dividend	764,239	469,583
Common dividend	1,261,332	727,248
Stock dividends	8,427,000	.....
The condensed balance sheet as of October 31 is as follows:		
Assets—	1916.	1915.
Plant and equipment.....	\$12,689,056	\$7,846,207
Quick assets	30,682,264	14,566,858
Other assets	5,846,474	3,866,862
Total	\$49,217,794	\$26,279,927
Liabilities—		
Capital stock	\$35,000,000	\$15,027,200
Current liabilities	9,167,973	1,944,600
Reserves	2,796,654	2,276,187
Surplus	2,253,168	7,031,940
Total	\$49,217,794	\$26,279,927

All the directors were reelected, as follows: F. A. Seiberling, C. W. Seiberling, G. M. Stadelman, F. H. Adams, P. W. Litchfield, H. B. Manton and J. P. Loomis. The directors in turn reelected the officers, as follows: F. A. Seiberling, president; C. W. Seiberling, vice-president; G. M. Stadelman, vice-president and sales manager; P. W. Litchfield, vice-president and factory manager; A. F. Osterloh, secretary; F. H. Adams, treasurer; W. E. Palmer, assistant secretary and assistant treasurer; H. J. Blackburn, second assistant treasurer.

During the present coal shortage the Goodyear company is supplying coal to its employees at cost.

L. C. Rockhill, manager of the auto tire department at the home office of the Goodyear company, and Mrs. Rockhill, with J. S. Willamen, district credit manager, and Frank E. Carroll, manager of the San Francisco branch, are taking a month's trip together in the Hawaiian Islands.

* * *

The Faultless Rubber Co., Ashland, Ohio, manufacturer of rubber sundries and specialties, remembered its employees at Christmas time in a unique and substantial manner. Each received a \$500 life and disability insurance policy for the protection of dependent relatives, the amount of which will be increased at the rate of \$100 annually until the maximum of \$1,000 is reached.

* * *

E. H. Trader, formerly with the American Express Co., has accepted a position as general salesman with the American Rubber & Tire Co., with headquarters at the Akron office.

* * *

The Falls Rubber Co., Cuyahoga Falls, Ohio, has increased its capital stock from \$300,000 to \$500,000.

THE RUBBER TRADE IN BOSTON.

By Our Regular Correspondent.

THE rubber industry in the matter of Christmas presents has been vividly illustrated by the Bailey Rubber Co., of this city, whose store, because of extensive and effective advertising in the daily papers, has compared favorably with department stores as regards the number of customers, compared to the area of floor space. C. J. Bailey is a generous advertiser, of long and varied experience, and his advertisements of "Useful Christmas Gifts," giving long lists of raincoats and rubber clothing, footwear, household articles, etc., and especially rubber toys, brought customers to the store by hundreds. Mr. Bailey, when

asked if business had been good with him, modestly replied in the affirmative, but the significant smile he wore spoke louder than words of his satisfactory holiday trade.

* * *

Another Boston institution which is doing an extensive business in rubber goods is the United Drug Co., whose chain stores are numbered in the thousands in many sections of the country. The importance of this institution in the rubber trade will be appreciated when it is stated that in six weeks over 75,000 hot water bottles were sold, and that the concern buys them in lots of 300,000 each. This is but one item of the rubber goods line which this company distributes. The latest innovation of the company is interesting. Already an order has been given for over 100,000 inner tubes for automobile tires. When a motorist needs an inner tube, he needs it as the Texan needs a pistol—mighty quick. Some garages stock no inner tubes, or only a limited number of sizes. Not all garage men carry the best makes, and the motorist must buy what he can get. There are now more Rexall stores than garages and the drug company management believes that with its reputation for quality, with its thousands of retail stores, all prominently situated, and nearly all of them open or accessible at all hours, there is a good prospect of selling half a million, or even a million inner tubes this year. These tubes will bear a special trade-marked name, owned by the company.

* * *

F. H. Appleton & Son, Inc., manufacturers of reclaimed rubber, have just completed a large addition to their plant at Franklin, Massachusetts. It is a three-story structure, 150 by 50 feet. As soon as this is in operation, the capacity of the plant will be nearly trebled. A new laboratory building has also been added, and equipped with up-to-date apparatus and appliances. As hitherto, Francis H. Appleton, senior, makes his headquarters at the Boston office, 185 Summer street, and Mr. Appleton, junior, will continue in charge of the manufacturing at the Franklin plant.

* * *

The Monatiquot Rubber Works Co., at South Braintree, Massachusetts, continues to add to its extensive plant and is breaking ground for the erection of another brick mill building. This is to be two stories high, 190 by 60 feet, and will closely follow in style the lines of the recently erected No. 2 building. To make room for the new addition, it was necessary to move the office building some little distance toward the center of the mill yard, and the journey was safely made without interfering with the office routine.

The new addition to factory No. 3 had a fitting dedication during the early part of December, when a member of the Billy Sunday party held a "shop meeting" there during the noon hour. Not only the company employees attended to a man, but invitations were also extended to the employees of the neighboring factories; and as a result of the enthusiasm shown, the management arranged for a weekly meeting during Mr. Sunday's stay in Boston.

The company's Christmas distribution this year took the form of savings bank accounts which were opened in the names of the individual employees. Each man was awarded an amount proportionate to his length of employment. It was felt that this plan would work out advantageously, and would be the means of inspiring each one to add regularly to his nest egg.

* * *

The Elastic Braid & Lace Co., a comparatively new corporation, has secured the factory and business of the A. M. Greenway Co., Chelsea, Massachusetts, and is manufacturing elastic cords, laces and braids for the shoe, corset and suspender trade. George Fickessen, who for several years managed the Greenway business, is treasurer of the company and has charge of the manufacture. Charles M. Porter is president and sales manager. Mr. Porter's office at 179 Summer street was badly damaged

recently by an extensive fire on the street floor of the building, as a consequence of which he has moved the Boston salesroom to 170 Summer street, the main office of the company being at Chelsea.

* * *

The A. B. S. Cement & Rubber Co., Inc., notice of whose incorporation appeared in the December issue of THE INDIA RUBBER WORLD, has moved into a new factory at Haverhill, Massachusetts, where it will manufacture rubber cement for the shoe trade and other industries. The officers are as follows: A. B. Alden, president; D. C. Smith, vice-president; M. A. Smith, treasurer; W. E. Bixley and G. H. Bixley, directors.

* * *

L. D. Apsley, president of the Apsley Rubber Co., Hudson, Massachusetts, is using his best endeavors to secure good housing for the employes of his company. He recently bought two estates on which he has built 16 houses, and there are now eight more in process of erection. He is also encouraging other operators to build suitable homes both for sale and for rent. It is safe to say that few manufacturing towns have better accommodations for workers than Hudson, and for this Mr. Apsley is to a large extent responsible. The Apsley Rubber Co.'s factory is running to the largest ticket in its history, with a force of about 1,500 hands.

* * *

The Dexter Manufacturing Co., 727 Atlantic avenue, Boston, manufacturer of rubber cements, with a factory at South Braintree, Massachusetts, has enlarged the scope of its activities, and is selling rubber soles and heels to the shoe manufacturing trade.

* * *

J. Frank Dunbar is president and Griswold Stowe treasurer of the J. Frank Dunbar Co., dealers in crude rubber and allied products. Mr. Dunbar has been prominent in this trade for years, being connected with Geo. A. Alden & Co., of this city. Mr. Stowe was formerly of the Stowe & Woodworth Co., proofer and manufacturer of mechanical goods, Campello, Massachusetts, selling out his interest in that concern to join Mr. Dunbar in forming the new company. The Boston office is at 201 Devonshire street, and the New York office at 71 Beaver street, the latter being in charge of J. Frank Dunbar, Jr.

* * *

A serious fire occurred at the plant of the Plymouth Rubber Co., in Canton, Ohio, on the morning of December 15, when the reclaiming department was entirely destroyed by fire, at an estimated loss of \$10,000.

* * *

Thomas A. Forsyth, president of the Boston Belting Co., was signally honored late in November in being made an honorary member of the Sigma Delta Sigma fraternity, this being the first instance in over half a century that this fraternity has admitted to its membership any one outside of the dental profession. This was, of course, because of Mr. Forsyth's great benefaction, the Forsyth Dental Infirmary, presented to the City of Boston.

* * *

Robert W. S. Cox, formerly New England salesman, and for the last few years sales manager for the insulated wire department of the National India Rubber Co., Bristol, Rhode Island, is now in business on his own account, having recently opened an office at 10 High street, this city. He will deal in insulated wires and cables, confining his trade to large jobbers and central stations. He has an unusually large acquaintance in this line of business throughout the country.

* * *

Harry G. Fisk, treasurer of the Fisk Rubber Co., Chicopee Falls, purposes to add to his various other activities by entering the dairy business on a rather extensive scale. He has purchased three adjoining farms in East Longmeadow, Massachusetts, comprising, in the aggregate, 125 acres, the highest and most

sightly land in the town. Next spring he will begin the erection of a handsome summer residence, and later farm buildings. He hopes, in a few years, to be the owner of a valuable herd of cattle.

* * *

P. D. Hammond, who will have charge of the new footwear department of the Firestone Tire & Rubber Co., Akron, Ohio, was in Boston early last month. Mr. Hammond was formerly connected with the Diamond Rubber Co., the Goodyear Tire & Rubber Co., and The B. F. Goodrich Co.

* * *

M. S. Connelly, formerly of Hoyt's Service and the Greenleaf Co., Boston, has been appointed advertising manager of the Hood Rubber Co., Watertown, Massachusetts.

* * *

Charles Bonney has been appointed manager of the factory of the E. H. Clapp Rubber Co., at Hanover, Massachusetts, and Martin Mullin, who has been connected with this concern for more than a quarter century, has been made superintendent.

THE RUBBER TRADE IN RHODE ISLAND.

By Our Regular Correspondent.

THE rubber plants throughout the state continue to be rushed with work, as they have been during the past year, and there are no evidences of any immediate diminution of the demand. For the first time in many weeks there is practically no trouble brewing among the employes of the different plants. In consequence of the increase in wages that has been put into effect during the past month, labor troubles have entirely disappeared and the managers and superintendents are correspondingly happy. Many of the manufacturers, however, are worried over the continued lack of expert or even competent employes, but this seems to be a situation that cannot be remedied under existing conditions.

Large shipments, many of them abroad, are being made daily from most of the plants, and it seems to be the general belief that the present schedule of work will be maintained for another year at least, this prediction being based upon the amount of orders now on hand or in prospect.

* * *

James Morrison, well known throughout New England from his connection with the rubber manufacturing industry in Chicopee, Massachusetts, and Providence, died at his home, 360 Lockwood street, in the latter city, late Monday afternoon, December 18. Early in the month he met with a severe accident at the service station of the Invincible Tire Co., 93 Fountain street, where he was foreman, by which one of the fingers of his left hand was so badly crushed in a pumping machine that it had to be amputated. Blood poisoning developed and resulted in his death. He was in his forty-fifth year.

Mr. Morrison was born in Glasgow, Scotland, in June, 1872, first coming to this country about a quarter of a century ago. With the exception of two or three years while he was in his native country, he had been in America since that time, making his home in Albany, New York, Springfield, Massachusetts, and Providence. He was first connected with The Fisk Rubber Co., as foreman of its factory at Chicopee Falls, Massachusetts. After a few years he moved to Providence to accept the position of inspector at the Revere Rubber Co., but for the past five years he had been in charge, as foreman, of the service station of the Invincible Tire Co. He is survived by his wife and one son. Fraternally, he was prominently identified with Clan Cameron of the Royal Scottish Clans.

* * *

Business at the factory of the National India Rubber Co., at Bristol, has been increasing to a great extent during the past few weeks and it is probable that steps will be taken with the commencement of the new year for a still further increase in the output of sporting and outing shoes. It is understood that the present output of 48,000 pairs each working day will be increased

to 55,000, necessitating an increase of employes, who now number upwards of 4,000. There are said to be orders enough on hand at present to keep the factory going for two years.

A number of important changes among the office force at the factory of the National India Rubber Co. have been made during the past month, several resignations making room for promotions in various departments. Arthur H. Emerson, who has been treasurer of the company for several years, has been appointed credit manager and assistant general sales manager of the wire division of the concern, and entered immediately upon the duties of his new position.

Maurice C. Smith, Jr., who has been a clerk in the office for a number of years, has been appointed assistant treasurer and will have full charge of the office and accounting department. Ralph W. Holt, formerly of Hudson, Massachusetts, who has been at the factory for the past two months, has been permanently assigned to take charge of the footwear department, under the management of the order, ticket and shipping departments.

William H. Gardiner has been appointed to succeed James H. Hoar, resigned as overseer of the varnishing and vulcanizing department. Mr. Hoar had been foreman of this department for nearly thirty years. He entered the employ of the National Rubber Co., as it was then called, in the autumn of 1866, working for several years in the varnishing and curing of rubber goods, until he acquired a skilled knowledge of his work. In 1877 he was appointed assistant foreman, Stephen Bourn, a former well-known rubber man, being then in charge of the department. In 1887 Mr. Bourn retired and Mr. Hoar succeeded him.

* * *

At the Narragansett Rubber Co. factory, at Bristol, the 700 employes are working full capacity in order to fill all demands and there are orders on hand sufficient to keep the plant in operation to its limit for many months to come. The concern has recently purchased a lot of land with a dwelling house thereon, at the corner of Wood and Catherine streets, which will be used in the expansion of the company's plant, made necessary by the constantly increasing business demands.

Terrence McCarthy, owner of the Narragansett Rubber Co., formerly the Consumers' Rubber Co., who has been confined to his home by a severe attack of the grip during the greater part of the past month, is able to be about again.

* * *

A contract for the erection of an addition to the box factory of the Alice Mill of the Woonsocket Rubber Co., at Woonsocket, has been awarded. Two stories will be added to the present building, in which are manufactured boxes used in the shipment of the products of the factory.

John F. McBride, who resigned last April as foreman of the packing department of the Alice Mill, of the Woonsocket Rubber Co., died at his home, 416 Second avenue, Woonsocket, on December 13 after a few weeks' illness of heart trouble. Last March he had an attack of pneumonia and never fully regained his health. He was born in Elderly, Scotland, but coming to this country with his parents, resided at Woonsocket from infancy. He was educated in the parochial school connected with St. Charles church and after leaving school entered the employ of the Woonsocket Rubber Co. He had been foreman of the packing department for more than 17 years when he resigned.

* * *

The Rhode Island Tire Co., 109-111 Broadway, Providence, is being conducted by Leonard Hinchcliffe, according to information filed at the office of the city clerk.

* * *

James R. Newbold, who for the past five years has been head calender man at the International Rubber Co., at West Barrington, has been promoted to the foremanship of that department.

Richard Unsworth, the old-time watchman at the Revere Rubber Works, on Valley street, Providence, had a narrow escape

recently from being killed on one of the elevators at the company's plant. He was confined to the Rhode Island Hospital several days.

* * *

William Howe has been made superintendent of the night forces at the Revere Rubber Co., and Charles Donovan, who had held that position for a number of years, has been promoted to the day service.

* * *

The creditors of George H. Decker, who conducted a retail rubber goods store under the style of The Decker Rubber Co., at 76 Weybosset street, Providence, held a meeting in bankruptcy recently at the office of the referee, Nathan W. Littlefield, and appointed Rhodes U. Eldred as trustee. The business has been disposed of by the trustee, who is now adjudicating the estate. The business is being continued by the Arcade Rubber Co. at the same address.

Frank S. Bowker, of Worcester, Massachusetts, has been appointed assistant superintendent at the American Wringer Co. plant, at Woonsocket, to fill the vacancy occasioned by the promotion of Jesse P. Walsh to the superintendency on the death of Michael M. Flynn, who had been superintendent for more than a quarter of a century. Mr. Bowker was connected with the Scotia Worsted Co., of Woonsocket, a number of years ago, but of late has been employed as supervisor at the Du Pont Powder Works, in New Jersey.

THE RUBBER TRADE IN TRENTON.

By Our Regular Correspondent.

SHORTAGE of soft coal has become a serious factor in Trenton. Many of the rubber manufacturers have been hard pressed for fuel on more than one occasion, but they have managed to keep steam up and the wheels moving. The local trolley line was unable to operate its cars for a short time last week because of inability to get coal.

* * *

A compressed air tank in the plant of the Joseph Stokes Rubber Co. exploded recently. Damage to the extent of about \$200 resulted. No one was seriously hurt, although several employes were in grave danger.

* * *

The John A. Roebling's Sons Co. has purchased 3,000 tons of structural steel for building operations it proposes starting in the spring. A considerable part of the steel, it is said, will be used in erecting an insulated wire mill.

* * *

The Delion Tire & Rubber Co. recently entertained its employes at a formal dinner in Geartner's. George H. Graham, Jr., secretary of the company, was toastmaster. H. H. Coleman, president of the company, was among the speakers.

* * *

Employes of the Empire Rubber & Tire Co. gave a generous contribution toward a fund to provide Christmas toys for the poor children of Trenton.

* * *

Trenton's first electrical show, recently brought to a close in the Masonic Temple, was a big success and largely attended. Insulated wire makers and other firms making rubber specialties for electrical goods participated.

Included in the number were the Thermoid Rubber Co., Joseph Stokes Rubber Co., Hamilton Rubber Co., U. & G. Rubber Manufacturing Co., John A. Roebling's Sons Co., and Home Rubber Co.

When the newly furnished State Museum is opened in the Capitol there will be an exhibit showing the method of making an automobile tire and the machinery employed in the operation.

The India Rubber Trade in Great Britain.

By a Special Correspondent.

AT the moment the trade is busy on all kinds of waterproof goods, not only for use at home, but also for the soldiers on the Continent. The wet season has caused a great demand for trench capes, waders, trench coats, trench boots, ground sheets, cap covers, cycle capes, scouts' suits, cyclists' overalls, motor hood cloths, and there continues to be a steady demand for gun breech covers, gas mask goods, respirator tubes, tires and numerous other articles for military use. Practically every rubber house in the Kingdom must be working on at least one class of government orders. In some quarters difficulty is being experienced in meeting the heavy requirements but, generally speaking, good deliveries are being made against existing contracts.

LEATHER BOOTS PREFERRED FOR THE ARMY.

Rubber boots are proving unsatisfactory at the front. British soldiers who have had three pairs report that all have been destroyed by barbed wire. Good leather boots are necessary. Some of the Canadian troops have high-legged boots with buckles up to the legs which are giving good service.

RUBBER PRICES.

Rubber companies are issuing new price-lists which show an advance. General mechanical rubber goods show an increase of 10 per cent from November 6, 1916, making the total advance since April, 1915, about 30 per cent. Hose, rubber belting and packing have advanced 15 per cent from the last previous price-lists, making for these articles a total advance of 35 per cent. Tire prices are substantially unaffected. It is generally understood that all fabrics for the rubber trade will now have to be quoted from 12½ to 25 per cent up, according to the class of yarns from which they are manufactured.

British manufacturers are steadily building up a trade in many lines of goods formerly manufactured in Germany and they would probably be doing much more than they are in this direction were their facilities not so heavily taxed with government orders and scarcity of male labor.

Our manufacturers do not have to look for business just now, it comes to them, and here is where their troubles begin. Once the business is obtained, first comes trouble in securing materials to execute the orders, and then comes difficulty in getting out the goods owing to the government demands for men all over the country.

NEW USES FOR RUBBER.

Hardly a day passes without bringing a demand for some use of rubber previously unheard of, and this is generally in connection with the war. For example, orders were recently placed with manufacturers for bags and coverings for listening posts. These bags and coverings are to be used for protecting very delicate instruments used in detecting movements of the enemy below, above and on the surface of the earth. It seems to be reasonable to affirm that no other commodity is so rapidly extending the range of its usefulness as rubber is, and, no doubt, many of the new uses of rubber the war has developed will continue in peace time.

HOT WATER BOTTLES.

The demand for rubber hot water bottles is large and buyers for concerns trading in this class of goods are receiving many offers from American and Canadian manufacturers who are generally to be represented by people unknown to the trade here and apparently unfamiliar with the rubber business.

The trade does not consider the American and Canadian-made bottles as durable as those of British manufacture. It is hard to say whether or not there is any serious basis for this belief, but it is certain that there is a feature in American-made bottles

which our manufacturers could well afford to imitate. This is a projecting semi-circular flap extending about half an inch from the bottom of the bottle and perforated. The great advantage to be seen in this is that it facilitates hanging upside down for complete drying, an improvement that is sure to be much appreciated by the user.

RULINGS ON IMPORT RESTRICTIONS.

In connection with the restrictions on the importation of certain goods, the following rulings have been made:

PROHIBITED.

Cotton bias bindings for use on rubber and canvas shoes.
Elastic of rubber and cotton, if cotton exceeds 50 per cent of the total weight.
Garlock packing.
Rubber-faced cotton fabric.
Bicycle-tire valves.
Canvas, solution coated, used in the manufacture of boots and shoes.
Fabrikoid.
"Omo" sheeting [cotton fabric coated with waterproof solution].

IMPORT ALLOWED BY GENERAL LICENSE.

Balls, tennis.
Cotton duck for belting weighing 11 ounces and upwards per square yard.
Goods consisting wholly or mainly of rubber.
Rubber-covered rollers for clothes wringers.

NOT PROHIBITED

Bakelite heads for umbrella handles.
Ebonite fork separators for use in connection with electric train lighting.
Elastic of rubber and silk.
Elastic surgical trusses.
Gummed cloth tape.
Hard ebonite tubes for use in connection with electric insulating.
Hose, garden hose, mainly of rubber.
Inner-tubes for motor cars.
Paragon tape for insulating joints in electric wires and cables.

ADVERTISING CONTINUES.

Despite the fact that the private use of motors has been greatly curtailed by various government orders, advertising for both automobiles and tires continues in our papers.

The North British Rubber Co., Limited, and the Dunlop Rubber Co., Limited, are both conspicuous advertisers; the latter is especially in evidence both in newspapers and magazines. Most of the tire advertising very naturally emphasizes good records made by the various tires under the exceptionally rigorous conditions of war service.

American tire manufacturers such as The B. F. Goodrich Co., the Goodyear Tire & Rubber Co., and the Firestone Tire & Rubber Co., are also remarkably active in advertising their wares.

The Michelin Tyre Co., Limited, has been running a very interesting advertisement in "The Times" entitled, "Endurance Will Gain the Victory," and illustrating four ways in which Michelin is participating in the war: (1) aeroplane and army tires; (2) 3,000 employees under the colors; (3) the Michelin hospital; (4) the Michelin shell factory.

A very human trait is exhibited in nearly all motor and tire advertising, and that is the desire on the part of the advertiser to let the public know how much he is doing for his country.

The tire agencies exhibit placards in their front windows telling how many of their men are at the front. In all the advertising of British concerns the "Buy from a British Maker" sentiment is played hard for getting business now and after the war.

WITH RUBBER TIRES ONLY.

The fact that a British manufacturer of steam wagons has placed on the market a 6-ton steam vehicle designed exclusively for use on rubber tires is notable. Steam lorries have been in use in England for many years, and it has been the custom to build them with steel tires, or with tires made up of wooden plugs. Of late solid rubber tires have been made optional and many users have found economy in the increased speed possibility and the protection from the wear and tear of excessive road vibration afforded by resilient rubber tires, but the new Atkinson 6-ton steamer is the first of its kind to be offered for sale with anything but rubber tires.

HOLLAND SHORT OF TIRES.

Tires are greatly needed in Holland, according to C. A. Geerkens, of H. Englebert & Co., The Hague, automobile dealers. American motor cars find a ready sale there, but are invariably shipped without tires, as no rubber goods are now allowed to pass the Allied blockade into neutral European countries whence they might find their way into Germany. Meanwhile, used tires are accorded that solicitous care which a faithful servant deserves.

PRIVATE SHIPMENTS TO RUSSIA RESTRICTED.

The Commercial Attaché of the Imperial Russian Embassy wishes to bring to the attention of American shippers interested in forwarding goods—including rubber articles—to Russia, via Vladivostok, the fact that the importation of private shipments is temporarily forbidden except under special permit. The existing regulations governing the importation of goods via Archangel apply at present to Vladivostok. It is necessary to make application for each individual shipment through the Russian consignee, to the Imperial Department of Commerce, Petrograd.

EXPORT OF RUBBER SOLUTIONS RESTRICTED.

The exportation from Great Britain of rubber solutions containing coal-tar products and derivatives is now prohibited to all destinations, except under license, which will not be granted if a solution contains any considerable percentage of benzol.

Manufacturers have been instructed to get in touch with the Department of Explosives Supplies, Ministry of Munitions of War, in order to ascertain the nature of the substitute for benzol, which in future should be employed in the manufacture of rubber solutions.

RUBBER EYES.

Two French inventors, Drs. Lemaître and Teuillières, have devised a system for making an artificial eye that can hardly be distinguished from a real one. They aimed at producing a substance of sufficient elasticity and softness to respond to the changes in the eye socket, and at the same time of sufficient hardness to present a smooth, natural effect between the eyelids. Rubber made it possible for them to produce an artificial eye that is said to be comfortable to wear and that moves almost as naturally as its mate.

The first step is to take an accurate cast of the eye socket in plaster of Paris, which the mucous membrane lining the orbit stands very well. From this cast a mold is made, and this is filled with rubber. The difficulty of consistency is solved by making the front of the new eye of hard rubber, vulcanized and enameled to represent the natural appearance, and the back of the eye of soft rubber, hollowed out in the form of a ball, and filled with air.

This artificial eye is thus perfectly elastic, pneumatic, and fits easily the irregularities of the eye socket, responding in a remarkable manner to the ocular movements. It does not irritate the orbit and is not easily broken.

OSTROMYSLENSKI AND HIS SYNTHETIC RUBBER.

"**L**E Caoutchouc & la Gutta-Percha," of November, 1916, announces that it has received from an illustrious collaborator, Dr. Yvan Kondakow, the following communication concerning the synthesis of rubber presented by Ostromyslenski, a translation of which was published in *THE INDIA RUBBER WORLD* of November 1, 1916.

The synthesis of rubber for special purposes, which has made so much noise, not only in Russia, but also in our friend country, France, presents nothing unforeseen nor remarkable.

Ostromyslenski only isolated a more handy way than the usual methods to obtain, so he affirms, butadiene by the action of acetic aldehyde on ethylitic alcohol in the presence of a catalyzer, such as alumine, at a temperature of 450 degrees C. The butadiene obtained is then purified by known methods and transformed into rubber by heat, in the presence or out of the presence of sodium.

What the value of this method of preparation is; what its cost of production commercially, no one in Russia knows. Despite the enormous expenditures made in his factories, Ostromyslenski has not yet attained any practical result.

One must admit that Ostromyslenski works and above all publishes much work, but his studies are not of a very serious character, for the author is not well acquainted with rubber literature and has a marked tendency to attribute to himself as his own discoveries, things that have been known for a long time.

DR. YVAN KONDAKOW.

THE SITUATION IN FRANCE.

By Our Regular Correspondent.

BUSINESS in rubber goods continues to be brisk, both for the government and private orders, and most manufacturers have now overcome the handicap of labor shortage which was very serious at the beginning of the war, especially for small concerns that had no government orders and could not, therefore, obtain special exemption for their skilled employees.

RAW MATERIALS.

The supply of raw materials, both rubber and compounding ingredients, is satisfactory. Considering the scarcity and the high cost of ocean freight, also the tremendous demand for rubber goods, rubber prices are comparatively low, but chemicals continue to be very expensive.

TIRES.

The chief demand is for pneumatic and solid rubber tires for motor vehicles, but manufacturers of proofed clothing materials, rubber footwear, insulated wire and cable are also doing a lively business.

Considering conditions, the demand for tires for private use is exceedingly good and manufacturers are able to take care of all requirements. Foreign tires have been imported, but these have practically all been for American vehicles requiring sizes not made in France.

The scarcity of leather that has resulted from the war has led our tire manufacturers to discard the studded-leather casings that formerly were so popular here. They have substituted the metal-rubber principle in which the studs are directly anchored in the rubber and fabric of the tire. This is a reversion to an early type of metal-stud tire which in the past was not satisfactory, but is now giving very good service thanks to improved methods of manufacture.

FUTURE SOLID-TIRE TRADE ASSURED.

Our soldiers of to-day will go back to business after the war with the knowledge that motor trucks are far superior to horse-

drawn vehicles for most purposes. As a consequence, the demand for solid rubber tires will be far greater after the war than it was previous to it, and our manufacturers will continue to



A SOLID RUBBER TIRE IN FRONT OF A LINE OF RUBBER TIRES

have good use for the modern machinery they have installed to take care of war orders.

THE CABLE INDUSTRY.

The shortage and the high cost of coal has been no small source of trouble to all manufacturers in France. Among the measures taken to minimize the ill effects of coal scarcity the most important is the active development of water power—white coal, as we call it. This development is resulting in unprecedented demands for insulated wire and cables; demands that are sure to continue and to grow after the reestablishment of peace. The prospects of our electrical industry are, therefore, very bright. Not only will insulated wire and cables have to be supplied for the total reconstruction and reequipping of the districts now in the enemy's hands, and which are among the richest industrially of the world, but there will be a demand for the development of new electrical power throughout the country.

In districts where water power is unavailable, the gas from coke ovens will be used to drive motors, which in turn will drive dynamos to produce electric current for all purposes.

THE BRUSH INDUSTRY.

Our brush industry has been unfavorably affected by the war. The bristles, which came mainly from Russia, Roumania and Leipzig, have been difficult to obtain, and the markets for the manufactured goods have been curtailed on account of the war and prohibitive prices.

Brush manufacturers here are looking to improved machinery to compensate for the scarcity of labor which will hardly be lessened by the ending of the war. They have also recognized the advantages of setting brush bristles in rubber, and there certainly is an excellent market here for American-made brushes.

RUBBER TUBES SAVE WOUNDED SOLDIERS.

A system of sterilizing wounds, which has been successfully applied in many hospitals here, employs rubber tubes provided with numerous holes through which antiseptic liquids pass to wash out deeply infected wounds. This method of irrigating wounds has reduced amputations by 50 per cent.

THE USE OF PONCHOS.

The square rubber garment, known as a poncho, and long the raincoat of the enlisted man of the United States army, has found equal favor among our soldiers in the trenches. Ponchos are not furnished by our government as part of the regular equipment, but great numbers of them have been supplied by the American LaFayette Fund Society. They are giving full satisfaction and it is not unlikely that they will be officially adopted.

THE RUBBER INDUSTRY IN SPAIN.

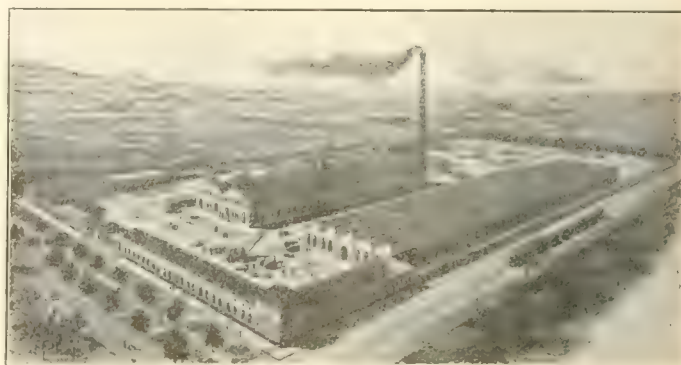
A Special Correspondent

THE paralyzation of Spain's commercial and industrial life, that immediately followed the outbreak of the war, has gradually passed, and the prosperity now reigning in Barcelona, our greatest commercial and industrial center, was never paralleled in time of peace. This prosperity is due to numerous orders from belligerent countries and to the fact that our manufacturers have no longer to suffer from foreign competition, which was very bitter before the war.

THE RUBBER INDUSTRY.

Our rubber industry has its full share of the general prosperity. Prior to the war, Spain was not producing more than 50 per cent of her requirements in rubber goods. The balance was imported from France, Germany, Austria-Hungary, Italy, England and the United States, and consisted chiefly in pneumatic tires for automobiles.

Within the past two years our rubber industry has grown so rapidly that it is able now to supply practically all domestic demands and to engage in an export trade which, during the past fiscal year, amounted to more than \$1,000,000. Prior to the war our rubber manufacturers exported a few articles to Latin



BARCELONA FACTORY OF PIRELLI & CO.

America, the Canary Islands and the Near East, but their foreign business had none of the importance it now has.

Our rubber industry is centered in and around Barcelona. There are concerns in other cities, but not large enough to deserve mention here. The following are the most important rubber factories in the Barcelona district:

- J. Anto, Arcjos, Agustin, 7.
- F. Capella, Pelayo, 34.
- M. Estobanell, Boqueria, 32.
- M. Ferrer Marcet, Union, 3.
- P. Garriga Escarpanter, Rbla. Sta. Mónica, 12.
- J. Gassó y Marti, Ancha, 31.
- M. Gisbert y Compañía, Paseo Colon, 6.
- Hutchinson, S. A., Rambla Cataluña, 64.
- G. Klein, Princesa, 61.
- Lacelle y Compañía, Universidad, 23.
- S. Llach, S. Pablo, 91.
- Viuda de Mno. Marcet, Pza. Teatro, 6.
- Matas y Compañía, Princesa, 6.
- Magpín Papiol, Pelayo, 58.
- Pirelli & Co., Villaneuva y Geltru.
- Ribase Iser, Trafalgar, 5.
- J. Ribera, Puertaferri, 25.
- J. Rosich, Urgel, 160.
- Luis Ferrer, Fernando, 16.
- Viuda de J. Sabater, Tallers, 6.
- Tusell Hermanos, Fontanella, 20.
- Pablo Fornt, Duquo Tetuan, 25.

VARIETY OF MANUFACTURES.

Spanish manufacturers are producing all kinds of rubber articles including mechanical goods, solid and pneumatic tires, druggists' sundries, toys, toilet articles, insulated wires and cables, cut sheet and molded goods of both hard and soft rubber.

TIRES.

Automobile tires furnish what is probably the largest single item of our rubber trade. Our tire market was formerly supplied by imports from France, Germany, England, Austria-Hungary, Italy and the United States. Now the United States and the domestic industry are getting the bulk of the tire business, though France and England continue to supply small quantities of both solids and pneumatics to their Spanish customers.

CRUDE RUBBER.

Seventy-five per cent of the crude and washed rubber consumed by our rubber factories is purchased in British markets. The balance comes from Portugal, France, Brazil, Colombia, Mexico and Africa. Prior to the war we imported small quantities of crude rubber from Germany and Belgium.

CHEMICALS.

The Spanish chemical industry also is centered around Barcelona. No other branch of our industries felt so keenly the effect of the war at the outset and no other industry has been more benefited by the war.

Prior to August 1914, our rubber manufacturers obtained their chemicals and compounding ingredients from England, Germany and France. Now the domestic industry is supplying much of the demand, but we continue to import such compounding ingredients as golden sulphuret of antimony, zinc oxide, rubber substitute and reclaimed rubber from England, the United States and France.

THE RUBBER TRADE IN JAPAN.

By a Special Correspondent

IMPORTS OF RUBBER SHOES AND OTHER RUBBER GOODS.

ON account of the war, the Japanese importation of rubber goods from the United States has increased, especially that of rubber shoes and electric tape. A few years ago it was estimated that Great Britain was leading in the exportation of rubber goods to the Orient, but during the last two years Japanese dealers have been supplied almost entirely by the United States. Below are the statistics for 1914 and 1915.

	1914.	1915 (to Mar. 1, 1916).
Rubber boots	4,471 pairs	5,601 pairs
Overshoes	20,811 pairs	22,943 pairs
Electric tape	23,045 pounds	42,399 pounds

The tendency is toward reduced imports this year, as the Japanese manufacturers are doing more skilful work, and are almost equaling American goods in quality.

INCREASED SHIPPING FACILITIES.

The matter of much needed steamship facilities is being solved in a measure by Japan, who has girdled the globe in her bid for foreign trade. She has extended her steamship lines, subsidized by the government, to every great port of call in the world, and is taking steps to retain after the war as much as possible of the great trade she has built up with Russia, China and South America. Russia has recently become Japan's best customer and is buying everything from munitions to boots and shoes. In the month of August alone Japan exported goods to Russia to the value of \$5,343,600. In China she will probably out rival all other countries. For the first nine months of the year her total exports to China were \$60,751,721, an increase of \$16,156,448 over the corresponding period a year ago, and during the last ten days of September reached \$2,446,309. With South

America, too, her trade has nearly doubled, amounting to \$1,036,660 in markets she hardly knew existed previously. Trade with Australia has also been growing amazingly. Japan's largest steamship company, the Nippon Yusen Kaisha, a firm in which the imperial family owns a great part of the stock, has just added two more vessels to its lines to the Antipodes, making a total of 10 Japanese vessels which are now plying between this nation and Australian ports. The Pacific Mail Steamship Co. is also increasing its facilities for trade between America and Japan, and this no doubt will be encouraged still further by the recently inaugurated Marconi trans-Pacific wireless service.

ORGANIZED LABOR MAKING PROGRESS IN JAPAN.

Japanese labor, always an interesting matter to Americans, is responding to the propaganda for western methods. Both male and female workers in Japan are taking up the organized labor movement with vigor, according to Bunji Suzuki, president of the Laborers' Friendly Society of Japan. At the recent convention of the American Federation of Labor he stated that the membership of the society had increased from 10,000 to 30,000 during the last eight months. Japanese laborers on the Pacific Coast, he said, are realizing American ideals and adopting American standards of living, and the influence is gradually affecting conditions in Japan also.

THE TAHAI RUBBER CO.

The Tahai Rubber Co. was organized as a stock company, but the charter members bought up all the stock before it was placed on the market. After purchasing the Kobe Rubber factory, the Standard Rubber factory, and seeking a site for another factory, headquarters were established at Kobe. Thus far activities have been confined to repairs and putting in new machinery. The company will manufacture any sort of rubber goods most needed in the market. The officers are as follows: Busuke Nishizawa, president; Shuhei Osaki, Ryosuke Nishioka, Zeno Tanakamaru, Yeisuke Yamazaki, Shimokuro Yamamoto, directors.

JAPANESE PLANTATIONS IN THE SOUTH SEA ISLANDS.

How Japanese rubber plantations will be affected after the war, it is impossible to foretell. These plantations are practically new, and, on account of the European war, rubber prices have remained so low that there has been little or no profit in them. Some of them, however, paid 15 or 20 per cent on their common stock and, generally speaking, the rubber business has been better than any other. The only difficulty has been that there was some speculation in order to make more profit than is generally expected.

Already the people have acquired a great deal of practical knowledge regarding the rubber business, and they are paving the way to establish well organized plantations. The Japanese Rubber Men's Association has given out the following statistics:

Total	39,886
Cultivated by Japanese	39,886
Owned by Japanese	39,886

These figures do not include the holdings of those not members of the association, and for this reason the totals must be much greater. It is estimated that \$15,000,000 has been expended in this section, which has not yet been tapped very much, for the plantations were not started before 1906, and so have not gained sufficient maturity to make it worth while. Probably by next year a great deal of latex can be taken from these new trees, as they will be just ready for the tapping season. For this reason it would be fortunate for Japanese growers if the war should end this year. They would be just in time to help supply the increased demand which peace would bring.

Thus far the Japanese have not lost anything on account of low rubber prices due to the war. While others have been facing difficulties, and changing their plans, our growers have been cultivating and making their new plantations ready for the time when peace will bring increased activity in the rubber

market. The war is sure to be over within three years, and by that time all of the young trees of this section will be producing their full amount of latex, insuring four or five thousand tons of crude rubber annually—enough in itself to supply all of the Japanese manufactories.

NEW PATENTS.

NISHIMURA RUBBER REPRODUCER

THE Oriental Rubber Co., of Tokio, has secured a patent for this device which is made of common rubber, and is used to reproduce any print in black or color from paper or other material. Papers are laid on a bench and pressed by the reproducer. A little heat is needed for the process, and at the end the papers are washed clean by a chemical solution.

RUBBERIZED WOVEN BELTS.

The Band and Belt Co., of Kobe, have rights in this invention. Twisted threads are woven together and then coated on both sides with a rubber fluid. The belts thus formed are cheap and strong, and give more satisfaction than those made of leather.

AUTOMATIC INK STAMP.

Toichi Watanake, of Tokio, is the inventor of this stamp. No ink has to be used except to keep the machine well filled.

CELLULOID POLISHER.

This is the invention of Teisuke Koyama. It is used to polish anything made of celluloid, and is generally considered better than cloth polishers. If all moisture is excluded in the making, the polisher is very durable.

THE BALATA INDUSTRY IN DUTCH GUIANA.

THE 1916 balata crop has been reaped and prospecting operations for next year's production are in full swing. A fair amount of money has been made this year, and had the European war not closed the most lucrative markets the returns would have been highly satisfactory.

The 1915 crop, however, was fairly good and had conditions been normal the balata industry in Dutch Guiana would now be in a flourishing condition. This statement is borne out by the report of the Balata Co., Surinam, extracts from which follow:

During 1915 the business has presented many difficulties, some of which were hard to face. We do not say these difficulties were connected with the new ordinance, under which for the first time the operations were carried out—in fact, this exploitation took place on too small a scale for the observation of the ordinance to come up to expectations—but the difficulties were the consequence of the belated enactment of the ordinance, so that the granting of concessions by the government also was considerably retarded. The result of this was that a goodly part of the laborers, not being able to afford a long idleness, had to seek other employment elsewhere. When, therefore, the operations were started afresh—some four months later than usual—only a very few men could be obtained.

Weather conditions, with the exception of a too early drought, were favorable, so that operating with only 370 men, a production of 99,608 kilograms [219,596 pounds] was brought in to our stores.

During the year past we could dispose of our balata here, and the stock at Paramaribo was also converted into cash. By these transactions the financial obligations were somewhat ameliorated and a part of the debit balance of advances was neutralized. It is proposed, therefore, to utilize the provisional profit-balance of the year 1915 in addition to the profits on the sales of the products of 1913-14, after deduction of the losses known at the end of those years.

The administration of the Balata Co., Guiana, has been amalgamated with the Balata Co., Surinam, and the exploitation of this concern appears to have given satisfactory results this year. Some delay was experienced, however, the rains not having appeared in the month of April as expected, and for the want of good drinking water, a bowel disorder broke out among the laborers. The last news from our administrator in Surinam

seems to indicate that the production will be satisfactory. Three times as many men are now operating in the bush. There is good reason to believe that the company has passed its worst period and that the future promises well.

According to the profit and loss account, the profits amount to 161,469 florins [\$64,910.54].

The above is but one example; if capital be invested judiciously in balata undertakings and well managed, there is big money to be made, and to the writer's knowledge no well-managed company ever failed. Of course, however, there is a certain amount of risk in all enterprises.

In the Nickerie district a very extensive balata area has just been discovered; it promises to rival any part of the colony so far under exploitation. This district has already enriched a few companies, and there is room for several more.

Up to the end of October reports coming in from the several districts were highly satisfactory; this gives every hope that the 1917 crop will be unprecedented, provided conditions are normal.

EFFECTS OF THE BRITISH BLACKLIST IN BRAZIL.

That Brazilian and Portuguese concerns in Brazil have been benefited by the effects of the British blacklist, is asserted by our South American contemporary, "Wileman's Brazilian Review," which states that, out of 13,751 tons of crude rubber exported from Brazil since the blacklist went into operation, blacklisted firms have shipped only 894 tons, whereas Brazilian and Portuguese concerns have shipped 4,689 tons.

MEXICAN DUTY ON CRUDE RUBBER.

A decree of the Carranza Government, published December 12, 1916, amends article I, section 4 of the revenue law of Mexico and, beginning December 15, 1916, places the export duty on guayule and caucho at \$0.10 per kilogram.

RUBBER TAPPING DURING WINTERING.

The question of the cessation of tapping plantation *Hevea* during the wintering period was brought up at a recent meeting of the Committee of Agricultural Experiments, Kandy, Ceylon. It was pointed out that, according to results obtained from experiments, there was no considerable variation in the amount of starch in the bark and wood from November up to the time of leaf fall in March. When the trees were leafless the amount of starch showed no signs of decreasing. It was deduced from investigations that the period during which plantation *Hevea* should be rested must include the period which extends from the time new leaves start growing to about three weeks after the leaves are fully developed.

Tapping during the wintering period was unprofitable, due to the small yield per tree, but it was not advisable to stop tapping operations, for the cessation of tapping would upset labor forces.

The question ultimately resolved itself as to whether the damage incurred by the trees through tapping in the wintering period was greater than the loss sustained by the disorganization of labor which could not be prevented were tapping operations suspended during the same period. Data on hand was insufficient to decide the question definitely.

RUBBER PLANTATION TRIPLES ITS OUTPUT.

The Brooklands Rubber Co., Limited, owning plantations in Selangor, Federated Malay States, reports profits amounting to £27,725, or \$138,625 for the fiscal year 1915-1916. The directors were able to raise the dividend from 9 to 15 per cent. The cost of production increased, chiefly on account of high freight rates, but the crop increased from 174,050 pounds to 397,007 pounds; 27,000 pounds above the estimate of production announced at the general shareholders' meeting in 1915.

Rubber Planting Notes.

RUBBER CULTIVATION IN SIAM.

HITHERTO most of the crude rubber exported from Siam has been of wild origin, gathered from vines in the jungles of the remote northern districts and carried by pack elephants in Thadua and from there down the Nam-Ta (Vien-Poukha) river to Luang-Prabang in French Indo-China. Some wild rubber also finds its way to Bangkok, capital and chief port of Siam.

With the development of Eastern rubber plantations, and owing to the destructive methods of the native gatherers, the gathering of wild rubber is rapidly on the decline, but Siam is developing rubber cultivation. The first rubber estate in Siam was established about ten years ago by a private syndicate with headquarters in Bangkok. In 1907 the members of this syndicate organized a company registered at Singapore as the Kombok Rubber Co.

The most important rubber plantation in southern Siam, however, is located at Chantaboon and consists of 25,000 trees planted about six years ago, of which 20,000 trees are now ready for tapping. In the Siamese Malay States, also, some attention has been given to rubber cultivation in the districts of Trang and Setul.

It has been impossible to obtain reliable information regarding the output of Siamese rubber plantations. During the last five years the export of crude rubber through the port of Bangkok has been comparatively small. Such shipments are listed by the local customs authorities under the head "Rubber and Rubber Substitutes," the exports under this classification amounting to 142,304 pounds for the fiscal year 1912, value \$18,533; 229,240 pounds for 1913, value \$32,548; 207,025 pounds for 1914, value \$33,431; 125,764 pounds for 1915, value \$15,533, and 187,980 pounds for 1916, value \$11,055.

TAXATION AND BARK RENEWAL.

In an article under this heading our English contemporary, "The India Rubber Journal," states that one good effect must result from the taxes now imposed on the rubber-planting industry. When rubber prices showed a very big profit excessive tapping seemed, in a measure, to be justified, but taxation to-day, however, has become so formidable as to make it inadvisable to continue the policy of tapping to the limit.

AMERICANS IN MALAYA.

The threatened invasion of Malaya by American capital was the subject of a lively discussion at a meeting recently held at Ipoh, Federated Malay States, by the Central Perak Planters' Association. The chairman, Mr. Ferguson, strongly opposed the advent of Americans, and others spoke in the same strain; but there was divergence of opinion as to what action could be taken. One member supported the influx of American capital. Finally it was resolved that "this association is not in favor of large areas being alienated under existing circumstances."

SINGAPORE CRUDE RUBBER TRADE.

That the exports of crude rubber from Singapore to the United States for the first nine months of 1916 were nearly twice as great as the combined exports of the same commodity to Great Britain and Continental Europe, is apparent from a recent report of the American Vice-Consul at that port.

Exports from Singapore to Continental Europe during the first nine months of 1916 decreased in practically all articles except plantation rubber, whereas shipments to Great Britain, in the main, increased. Rubber exports rose in all cases, Europe's

purchases of 3,900 tons during the period in question being 45 times greater than the 1913 figure. Great Britain's increase was from 6,354 tons, in 1913, to 10,914 tons in 1916, and that of the United States from 1,914 tons to 26,913 tons, or about 1,300 per cent.

SOUTH AFRICA PROHIBITS RUBBER EXPORTS.

A recent proclamation of the Government of the Union of South Africa places an embargo on all exports of rubber, gutta percha and balata, crude or manufactured.

NETHERLANDS INDIES RUBBER EXPORTS TO UNITED STATES.

Exports of crude rubber from the Dutch East Indies to the United States during the three months ending September 30, 1916, amounted to 8,745,635 pounds, as compared with 4,631,320 pounds exported during the corresponding period of 1915.

THE SITUATION IN NYASALAND.

The amount of trade and revenue in this British Protectorate during the fiscal year 1916 not only exceeded that of 1915, but showed an increase compared with 1913-14. The crude rubber industry shared in the general prosperity, the exports of plantation rubber alone showing an advance from 33,685 pounds, in 1914-15, to 46,002 pounds in 1915-16.

THE RUBBER INDUSTRY OF THE GOLD COAST.

INTERESTING details respecting the rubber industry in 1915 are given in a report recently issued by the Director of Agriculture of the colony.

HEVEA RUBBER.

During the year the government's agricultural stations distributed 349,450 *Hevea* seeds and 53,305 *Hevea* plants which had been raised in their nurseries; 238 per cent more plants were distributed in 1915 than during the previous year and nearly one-third of them was distributed in the Peki district.

The agricultural stations did not distribute all the *Hevea* seeds produced on their plantations, however, and the undistributed seeds were decorticated and pressed for oil extraction. Exports of crude rubber showed a decrease, the amount being 647,982 pounds against 654,133 pounds in 1914.

TAPPING, SPACING AND OTHER EXPERIMENTS.

Tapping experiments conducted at the various agricultural stations proved the half-herring bone system to be the most economical method of tapping; also that better yields were obtained where the lateral cuts were made on the left-hand side of the tapping channel. Experiments were also conducted to determine the effect of tree spacing upon yield per tapping. These showed that a much higher average yield per tree per tapping is obtained in plots planted 15 by 15 feet as compared with plots where trees of the same age are planted 12 by 12 feet. In the former case the average yield per tree was 44 ounces at each tapping, while in the latter the yield was only 24 ounces. Yields per acre for the two systems of spacing, based on the assumption that each tree was yielding the above average, gave the approximate ratio of 8.7 in favor of the more widely planted trees. *Funtumia* trees previously tapped are annually decreasing in yield, and the cultivation of these trees is being abandoned. Root parasites presented the most serious diseases affecting *Hevea*. Fungoid diseases, though troublesome, in most cases responded to treatment.

Recent Patents Relating to Rubber.

THE UNITED STATES.

ISSUED NOVEMBER 13, 1916.

- N** 1,206,857. Interchangeable rim clamp. J. Kelsey, Detroit, Mich.
 1,206,867. Educational toy balloon. J. Lewis, Brooklyn, N. Y.
 1,206,900. Rubber block tire. F. B. Pfeiffer, Akron, Ohio.
 1,206,932. Cylindrical rubber block tire. C. A. Simmons, Albany, N. Y.
 1,206,948. Pneumatic tire. G. B. Van Wagenen, Alstead Center, N. H.
 1,206,976. Elastic finger support for writing instruments. J. F. Barth, Cleveland, Ohio.
 1,206,983. Separable storage batteries. W. I. Bliss, assignor to U. S. Light & Heat Corporation, both of Niagara Falls, N. Y.
 1,206,990. Resilient tire for vehicle wheels. C. C. Collins, South Lebanon, Ohio, assignor to The Superior Tire & Rubber Co., Augusta, Me.
 1,207,120. Nipple and comforter for infants. H. H. Younker, New York City.
 1,207,121. Reservoir shaving brush. F. W. Zeidler, Jersey City, N. J.
 1,207,185. Spring tire with rubber tread. F. Lotter, Elkton, Mich.
 1,207,277. Rim for pneumatic tires. W. E. Copithorn, Natick, Mass.
 1,207,287. Storage battery comprising a rubber jar. B. Ford, Philadelphia, Pa.
 1,207,317. Fountain pen casing. F. W. Olive, assignor to J. Lipic—both of St. Louis, Mo.
 1,207,377. Cover for nursing bottle. W. M. Decker, Buffalo, N. Y.
 1,207,408. Dust cap for air valves for auto tires. A. J. Ingersoll, Bridgeton, N. J.
 1,207,427. Pump for pneumatic tires, comprising a block of resilient material interposed between the inner tube and its casing. H. F. Molkenbur, St. Paul, Minn.
 1,207,440. Automobile cap comprising an elastic band. F. Raudnitz, New York City.
 1,207,594. Pneumatic tire protector. E. E. Miller, Lewisburg, Pa.

ISSUED NOVEMBER 21, 1916.

- 1,205,161. Tire rim. H. M. Chaney, Sardinia, Ohio.
 1,205,215. Overshoe with an opening at the heel and a surrounding elastic sleeve. F. E. Jousset, New York City.
 1,205,345. Method of producing reinforced, flat vulcanized articles. A. L. Hatfield, Hillside, N. J.
 1,205,410. Injection apparatus comprising rubber tubing. A. C. Tenney, Chicago, Ill.
 1,205,517. Rim for vehicle wheels. C. W. Gressle, assignor to The Standard Welding Co.—both of Cleveland, Ohio.
 1,205,528. Tire supporting rim for vehicle wheels. T. W. Guthrie, assignor to The Standard Welding Co.—both of Cleveland, Ohio.
 1,205,657. Securing resilient tires to vehicle wheels. O. A. Parker, New York City.
 1,205,669. Dress shield. C. D. Bennett, Cresskill, N. J.
 1,205,751. Non-skid chain. J. Kirkwood, Lenox, Mass.
 1,205,847. Fountain pen. C. W. Roman, Brooklyn, N. Y., assignor to Eagle Pencil Co., New York City.
 1,205,849. Tire valve. J. A. Bowden, Los Angeles, Calif., assignor to A. Schrader's Son, Inc., Brooklyn, N. Y.
 1,205,876. Demountable rim. O. E. Dingley, West Farmington, Me.
 1,205,903. Wheel rim. R. M. Keating, Springfield, Mass.

ISSUED NOVEMBER 28, 1916.

- 1,205,988. Demountable tire rim. G. C. Allison, Canton, Ohio.
 1,205,990. Sponge rubber toe straightener. J. W. Arrowsmith, assignor to The Arrowsmith Manufacturing Co., Inc.—both of Morristown, N. J.
 1,205,994. Sewing and mending machine. T. A. Leavitt, assignor to Boston Belting Co.—both of Boston, Mass.
 1,205,997. Rubber cap attachment for rubber hose. C. E. Gitten and A. M. Brown, Houston, Tex.
 1,205,999. Sweat band including an elastic band. L. B. Heady, Houston, Tex.
 1,206,007. Tire comprising an outer casing and a plurality of inner metallic rings. E. F. Howard, Ansonia, Ohio.
 1,206,014. Protective covering for ice-bags. A. L. Saltaper, Houston, Tex.
 1,206,017. Bathing cap and method of making same. A. C. Squires, Keyport, N. J., assignor of one-half to D. Basch, New York City.
 1,206,064. Tire tool. M. Waters, New Albany, Ind.
 1,206,067. Elastic trouser belt. J. S. Wohlgemuth, Pittsburgh, Pa.
 1,206,111. Rubber glove having flutes along the backs of the fingers. J. C. Gibson, Akron, Ohio.
 1,206,220. Rubber hose. W. W. Kincaid, Meadville, Pa.
 1,206,221. Packing comprising a rubber core. J. Crane, assignor to Crane Packing Co.—both of Chicago, Ill., a partnership consisting of J. Crane and J. Crane.
 1,206,222. Rubber tread for footwear. A. McTernan, Andover, Mass.
 1,206,223. Elastic support for flat feet. R. C. Schwartz, Opelika, Ala.
 1,206,224. Elastic support for flat feet. A. Dusterwald, Halle-on-the-Saale, Germany.
 1,206,225. Demountable rim. L. G. Fleming, Tarrytown, N. Y.
 1,206,226. Rubber shoe sole. J. R. Kneel, New York City.
 1,206,227. Pneumatic horse collar. L. E. Van Treese, Letts, Ind.
 1,206,228. Tire armor. J. W. Whitsett, Berkeley, Calif.
 1,206,229. Turn shoe sole. C. C. Burnham, assignor to the B & R Rubber Co.—both of North Brookfield, Mass.
 1,206,230. Method of making turn shoes. C. C. Burnham, assignor to the B & R Rubber Co.—both of North Brookfield, Mass.
 1,206,231. Automobile wheel rim. F. F. Enter, Cuyahoga Falls, Ohio.

- 1,206,857. Interchangeable rim clamp. J. Kelsey, Detroit, Mich.
 1,206,867. Educational toy balloon. J. Lewis, Brooklyn, N. Y.
 1,206,900. Rubber block tire. F. B. Pfeiffer, Akron, Ohio.
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 1,207,185. Spring tire with rubber tread. F. Lotter, Elkton, Mich.
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 1,207,287. Storage battery comprising a rubber jar. B. Ford, Philadelphia, Pa.
 1,207,317. Fountain pen casing. F. W. Olive, assignor to J. Lipic—both of St. Louis, Mo.
 1,207,377. Cover for nursing bottle. W. M. Decker, Buffalo, N. Y.
 1,207,408. Dust cap for air valves for auto tires. A. J. Ingersoll, Bridgeton, N. J.
 1,207,427. Pump for pneumatic tires, comprising a block of resilient material interposed between the inner tube and its casing. H. F. Molkenbur, St. Paul, Minn.
 1,207,440. Automobile cap comprising an elastic band. F. Raudnitz, New York City.
 1,207,594. Pneumatic tire protector. E. E. Miller, Lewisburg, Pa.

ISSUED DECEMBER 12, 1916.

- 1,207,813. Method for preserving tennis balls or other objects containing fluid under pressure. F. W. Stockton, Chicago, Ill.
 1,207,814. Method for preserving tennis balls or other objects containing fluid under pressure. F. W. Stockton, Chicago, Ill.
 1,207,852. Confectionery mold comprising compressible elastic material. R. C. Burger, Toronto, Ontario, Canada.
 1,207,882. Tire valve. C. J. Dorff, Chicago, Ill.
 1,207,894. Self-sustaining resilient liner for wheel tires. C. F. Geyer, Akron, Ohio.
 1,207,927. Wheel rim. R. M. Keating, Springfield, Mass.
 1,207,975. Rim construction. H. Mills, Philadelphia, Pa.
 1,208,006. Life raft comprising a flexible inflatable mattress. J. Rembiszewski and E. Grodzki, Worcester, Mass.
 1,208,064. Cleaning device having a friction face of unvulcanized crepe rubber. L. J. Wilber, Brockton, Mass.
 1,208,122. Rim for automobile wheels. L. G. Fleming, Tarrytown, N. Y.
 1,208,139. Apparatus for improving the contour and condition of the chin and throat. F. N. Graham, New York City.
 1,208,149. Detachable sand-tread for tires. W. G. Haning, Riverside, Calif.
 1,208,158. Game device employing elastic cord. C. S. Hill, Belmont, Mass.
 1,208,198. Bathing suit having an inflatable lining. S. Penksa, Glen White, W. Va.
 1,208,209. Laminated leather and rubber fabric for shoe soles and the like. J. D. Prince, Boston, Mass.
 1,208,222. Demountable rim construction. R. W. Skillin, Oak Park, Ill.
 1,208,232. Inflatable bag safety device for swimmers and like uses. F. W. Taylor, Cicero, Ill.
 1,208,605. Pump for inflating tires. S. G. Dickson, New York City.
 1,208,615. Dipped rubber hot water bottle and method of making. H. F. Mitzel, assignor of one-half to W. M. Rose, Hyde Park—both of Boston, Mass.
 1,208,653. Fountain pen. K. Rauhle, Hennef, and A. Koehler, Kolmar, Germany, assignors to K. Rauhle & A. Koehler, Hennef—both in Germany.

REISSUES.

- 14,231. Watch holding and attaching rubber device. S. G. Lewis, Greensburg, assignor of one-half to G. W. Daum, Jeannette—both in Pennsylvania.
 14,232. Elastic support for time pieces. S. G. Lewis, Greensburg, assignor of one-half to G. W. Daum, Jeannette—both in Pennsylvania.

THE DOMINION OF CANADA.

ISSUED SEPTEMBER 30, 1916.

- 171,781. Rubber glove for foot use. E. K. Plank, Los Angeles, Calif.
 171,780. Collapsible pail. The Gutta Percha & Rubber Limited, assignee of W. Seward—both of Toronto, Ontario, Canada.
 171,805. Eraser. E. M. O'Herron, Pittsburgh, Pa., assignee of J. A. Coyle, Baltimore, Md.
 171,821. Rubber impregnated storage battery separator. T. A. Willard, Cleveland, Ohio.

- 171,823. Case for nursing bottle. L. C. Butler, New York City.
 171,851. Teat cup for milking machine. H. R. Jenkins, Eltham, Taranaki, New Zealand.
 171,890. Necktie with rubber lining. W. A. McWatty, Duluth, Minn.
 171,996. A bowling pin the body consisting of hard vulcanized rubber and fibrous material. The Brunswick-Balke-Collender Co., Chicago, Ill., assignee of M. J. Whelan, Muskegon, Mich.
 172,076. Bath mat. E. L. Livingston, West Orange, N. J.
 172,096. Pedal pad. G. H. Rives, New York City.

THE UNITED KINGDOM.

PATENT SPECIFICATIONS PUBLISHED.

In order to give the public the advantage of having abridgements of specifications up to date while retaining their numerical sequence, applications for patents made subsequent to 1915 are given new numbers when their complete specifications are accepted, or become open to public inspection before acceptance. The new numbers start with No. 100,001 (without any indication of date), and supersede the original application numbers in all proceedings after acceptance of the complete specifications.

[ABSTRACTED IN THE ILLUSTRATED OFFICIAL JOURNAL, NOVEMBER 8, 1916.]

- 10,363 (1915). Soft rubber suction disk for suction dentures. N. Cohen, Lewland Villa, Wellington street, and F. Bowerman, 216 County Road—both in Swindon.
 10,457 (1915). Non-skid device for twin tires. S. B. D. Morgan, 15 Roland Gardens, South Kensington, London.
 10,481 (1915). Floats for hydro-aeroplanes comprising inflatable air chambers and a pneumatic tire. J. Schweitzer et Cie, Seine, France.
 10,559 (1915). A renewable tread for tire covers. J. Yates, 13 Joseph street, Sutton, St. Helens, Lancashire.
 10,569 (1915). Inflatable pontoon, etc. A. E. Jones, 37 Liddon Terrace, Leeds, Yorkshire.
 10,574 (1915). Vehicle wheel comprising an outer rigid rim carrying a sectional rubber tread. J. Slee, Moss House, Wargrave Old Road, Newton-le-Willows, Lancashire.
 10,593 (1915). Non-skid tread band for wheel tires. M. G. Cervello, Caxton House, Westminster, and R. H. Neal, 8 Fielding Terrace, Ealing Common, London.
 10,657 (1915). Dress shield. T. McKenna, 31 Basinghall street, London.
 10,688 (1915). Disks and washers made of coir yarn fabric impregnated with rubber, balata, etc. G. D. Rose, 14 Albert Park Road, Lower Broughton, Salford, Manchester.
 101,461. Rubber cylinder for hat finishing apparatus. W. E. Turner, Ashton Road, and R. Lowe, 25 Goole street—both in Denton, near Manchester.
 101,465. Rubber stair treads. G. Anderson, and Leyland & Birmingham Rubber Co., 24 Duke street, Aldgate, London.

[ABSTRACTED IN THE ILLUSTRATED OFFICIAL JOURNAL, NOVEMBER 15, 1916.]

- 10,772 (1915). A new typewriter platen roller with rubber sleeve between the core and outer sheath. Underwood Typewriter Co., 30 Vesey street, New York City, and J. J. Cooper, 120 Queen street, London.
 10,773 (1915). Heel with rubber tread. L. Clarke, 207a Brompton Road, London.
 10,880 (1915). Securing loops of fabric or leather to rubber cord. W. P. Dando, 126 Highbury New Park, London.
 11,064 (1915). Doll whose limbs are retained in their sockets by elastic cords. F. Wilkins, 23 Grove Road, Wallasey, Cheshire.
 101,516. Tire tool. C. Goodijn, 16 Nicolaes, Witsenstraat, Amsterdam, Holland.

[ABSTRACTED IN THE ILLUSTRATED OFFICIAL JOURNAL, NOVEMBER 22, 1916.]

- 11,070 (1915). Hollow tire with metal embedded reinforcing ring. E. B. Killen, 27 Queen Victoria street, and Commercial Tyre Co., 22 Albert Embankment—both in London.
 11,100 (1915). Tire valves. E. A. Hilding, Lidköping, Sweden.
 11,165 (1915). Rubber tire for casters and rollers. A. B. Williams, Weaman street, Birmingham.
 11,170 (1915). Wheel tire composed of alternate blocks of hard and soft rubber. J. Elias, 96 Regent Road, Salford, Lancashire.
 11,239 (1915). Rubber casing for hand grenade and the like. J. Gray, 9 Albert Drive, Crosshill, Glasgow.
 11,446 (1915). Vacuum suction with rubber cap. W. H. Forries, National Park, N. J., U. S. A.
 11,296 (1915). Rim attachment for block tires. W. T. G. Ellis, 15 Cambridge street, Glasgow.
 11,306 (1915). Rubber studs for hat finishing apparatus. W. E. Turner, Ashton Road, and R. Lowe, 25 Goole street both in Denton, near Manchester.
 11,336 (1915). Arch support with elastic band. J. Batten, 63 Ridge Road, Letchworth, Hertfordshire.
 11,339 (1915). Elastic cord device for securing paper to drawing boards. A. T. Wright, and H. T. Wright, 37 Finsbury street, Holborn, London.
 11,387 (1915). Rubber to spreaders. P. G. H. Hinder, Oxford House, Oxford street, London.
 11,388 (1915). Foot arch supports with rubber studs. P. G. H. Hinder, Oxford House, Oxford street, London.
 101,526. Rubber wiper for motor or tram-car windows. M. L. Morton, 1226 Murray Hill avenue, Pittsburgh, Pa., U. S. A.
 101,529. Rubber watch holders. S. G. Lewis, Greensburg, Pa., U. S. A.
 101,536. Rubber coated rollers in machine for making artificial leather, fur, etc. T. Schmid, and J. Biltzer, Bern, Switzerland.

- 101,537. Rubber coated felt ball. St. Mung, Manufacturing Co., 12 Sylvan street, Newark, N. J., U. S. A.
 101,560. Rubber blocks mounted in metal shoes secured to a cover of vulcanized leather. G. H. G. Oldham, and P. E. Clark, Scotsburn, Toorak Road, Toorak, Victoria, Australia.
 101,561. Rubber tipped toy swords, bayonets, daggers, knives, and spears. R. Kitchin, Lupton Works, Darwin street, Birmingham.
 101,570. Pneumatic tire pressure gages. M. C. Schweinert, 226 Palisade avenue, West Hoboken, N. J., U. S. A.
 101,574. Tire carrying rim. J. A. Law, 29 Southampton Buildings, Chancery Lane, London.
 101,587. Catch with pneumatic rubber tip. G. Hipwood, 149 Warren avenue, Boston, Mass., U. S. A.
 101,589. Solid tire. W. B. Estes, 258 Valley Road, West Orange, N. J., U. S. A.

[ABSTRACTED IN THE ILLUSTRATED OFFICIAL JOURNAL, NOVEMBER 28, 1916.]

- 11,482 (1915). Waterproof life-saving garment. T. Matthews, 161 Dwight street, Brooklyn, N. Y., U. S. A.
 11,503 (1915). Detachable emergency tread. M. W. Dadey and E. Selberg, Winslow, Arizona, U. S. A.
 11,504 (1915). Wheel tire comprising an outer cover with a filling of hollow rubber balls and unvulcanized rubber. H. E. Wolken, Leigh, Nebraska, U. S. A.
 11,582 (1915). Spring wheel rubber cushion. T. G. Jelly, 1 Court, 4 House, Charles street, Coventry.
 11,689 (1915). Reservoir pen. J. L. Clarke, 25 Clarendon Square, Leamington Spa, Warwickshire.
 11,722 (1915). Apparatus comprising a rubber cylinder for making phonograph records. T. Eynon, 3708 North Ashland avenue, Chicago, Ill., U. S. A.
 101,624. Elastic block tire. H. Raflovich, 1301 Washington avenue, New York City, U. S. A.
 101,649. Draftsman's rule of hard rubber. A. E. Hegardt, 1536 North 58th street, Philadelphia, Pa., U. S. A.

THE FRENCH REPUBLIC.

PATENTS ISSUED (WITH DATES OF APPLICATION).

- 480,743 (January 22, 1916). Improvements in shock absorbing heels. A. K. Pomeroy.
 480,824 (February 1, 1916). Improvements in tire caliper-gages. The B. F. Goodrich Co.
 480,892 (February 9, 1916). Pump for pneumatic tires and other purposes. H. Parkes.
 480,904 (January 24, 1916). Plastic material susceptible of being used as a substitute for celluloid, leather, etc., and process for its manufacture. S. J. Peachey.
 480,934 (February 11, 1916). Pneumatic tire arrangement. H. W. Van Maeteren, A. Edwards and H. Headley.
 480,967 (December 30, 1915). Elastic wheel without pneumatic tire adaptable to any hub. A. A. A. Darche.
 480,972 (February 16, 1916). Improvements in fire hose, garden hose and others. R. Many.
 480,973 (February 14, 1916). Special pneumatic pillow. L. Malinge.
 480,983 (February 17, 1916). Wheel with a solid or hollow tire having its hub enclosed in an elastic ring. M. F. Kettler.

TRADE-MARKS.

THE UNITED STATES.

- 82,721. The word STORK within a circle of babies' heads—rubber nipples. United States Rubber Co., New York City.
 85,838. The word NEUTRAL superimposed by an oval shaped figure, the letters conforming to the shape of the oval—waterproof automobile and carriage fabrics. F. S. Carr Co., Boston, Mass.
 95,641. The word CHALLENGER—golf balls and golf accessories. J. P. Cochrane, Edinburgh, Scotland.
 96,832. The word FARRAGUT—hose made partly of rubber and partly of cotton. The Manhattan Rubber Manufacturing Co., New York City.
 81,475. An illustration of a high rubber boot having a yellow top band—rubber boots and shoes. United States Rubber Co., New York City.
 81,476. An illustration of a high rubber boot having a violet top band—rubber boots and shoes. United States Rubber Co., New York City.
 81,477. An illustration of a high rubber boot having a blue top band—rubber boots and shoes. United States Rubber Co., New York City.
 81,478. An illustration of a high rubber boot having a green top band—rubber boots and shoes. United States Rubber Co., New York City.
 81,479. An illustration of a high rubber boot having a green top band—rubber boots and shoes. United States Rubber Co., New York City.
 81,480. An illustration of a high rubber boot having a white top band—rubber boots and shoes. United States Rubber Co., New York City.
 85,589. The word HORSESHOE—inner tubes for tires, and non-metallic tires and tire casings composed of rubber or rubber and fabric. Racine Auto Tire Co., Racine, Wis.
 85,688. An illustration of a medallion with pendent streamers, both being printed in the same composition, date, etc. The Bessy Newhall Co., New York City.
 85,689. The word FARRAGUT—hose made partly of rubber and partly of cotton. The Manhattan Rubber Manufacturing Co., New York City.
 95,193. The word AMERICAN—rubber boots. Associated Manufacturers Co. of New York, New York City.

- 98,643. The word **UWEAR**—rubber boots and shoes. Goodyear Rubber Co., Middletown, Conn.
- 94,187. A representation of a tire encircling an automobilist's head, above which is the head of an open-mouthed tiger, with the words **ALWAYS HOLD WITHIN ITS OPEN MOUTH—vulcanizable fabric tire repair material.** W. U. Cowan, Chicago, Ill.
- 98,015. The word **TIREOID**—composition for healing punctures in pneumatic tires. The Tireoid Co., Chicago, Ill.
- 98,505. The word **SYMBOL**—druggists' rubber goods. United Drug Co., Boston, Mass.
- 94,885. The word **EASYSTRIDE**—shoes made of leather, rubber, etc. Brokaw Brothers, New York City.
- 97,359. A representation of a head with horns and the words **THE DEMON** written thereon—tennis-balls, cricket-balls, foot-balls, hockey-balls, bats, and rackets. Slazengers, Limited, London, England.
- 97,450. The words **RELIANCE DE LUXE**—household rubber gloves. The Faultless Rubber Co., Ashland, Ohio.
- 97,457. The word **DAUNTLESS**—raincoats and trousers. Solomon Newman, New York City.
- 97,502. A four-cornered drawing with the word **NORWOOD** across the center—The Cincinnati Rubber Manufacturing Co., Norwood, Ohio.
- 97,503. A four-cornered drawing, at each corner the letter **C. R. M. Co.** and in the center the word **CONGO**—belting, hose, and packing. The Cincinnati Rubber Manufacturing Co., Norwood, Ohio.
- 98,219. The representation of a seascape and the words **THE RISING SUN** and **THE GREAT COLOUR MAKER**—pigments for use in rubber, etc. Orrs Zinc White, Limited, London and Widnes, England.
- 98,525. The word **POLACK**—packing, hose, tubes, solid rubber tires, and pneumatic rubber tires. Polack Tyre & Rubber Co., New York City.
- 98,729. The words **OUR PIPPIN**—suspenders. The Gluckauf Co., Inc., New York City.
- 98,730. The words **OUR DANDY**—suspenders. The Gluckauf Co., Inc., New York City.
- 90,592. The letters **N** and **T** intertwined—rubber boots and shoes. The Beacon Falls Rubber Shoe Co., Beacon Falls, Conn.
- 97,587. The word **SLIPON** written within the letter **S**—rubber pedal covers. Mattson Rubber Co., Lodi, N. J.
- 98,193. A representation of a pneumatic tire, and around the inside of the tire the words **TOURISTS DELIGHT, MILES AND SMILES**—puncture proof solution. J. N. Neal, Coldwater, Mich.
- 98,602. The words **THE HIGHWAY**—automobile tire casings and tire tubes composed of rubber. The National Tire & Rubber Co., East Palestine, Ohio.
- 98,607. The word **PROXITE**—waterproof clothing. New York Mackintosh Clothing Co., New York City.
- 98,704. An illustration of a man holding the globe over his head, on the globe is written the word **SAMPSON**—tennis balls, golf bags, and sporting goods. C. J. O'Riely, Los Angeles, Calif.

THE DOMINION OF CANADA.

- 21,980. A laughing face surrounded by a tire—rubber tires, inner tubes, valve patches, inner cases and rubber tubing of all descriptions. Lee Tire & Rubber Co., Whitmarsh, Montgomery, Pa.
- 21,993. The word **FAULTLESS** and the representation of a shield bearing the initials **F** and a fly—certain named rubber goods. The Faultless Rubber Co., Ashland, Ohio.

THE UNITED KINGDOM.

- 373,577. The word **KALAD**—insulating preparations (electrical) composed of bitumen and shale oil. Callender's Cable & Construction Co., London, E. C.
- 373,644. A lozenge containing the letters **BHAS**—litharge, lithopone, red and white lead. The Broken Hill Associated Smelters Proprietary, Limited, London, E. C.
- 374,017. The word **FORMITE**—electrical insulating preparations made of materials included in class 50. Damard Lacquer Co., Limited, London, S. W.
- 374,332. The word **SEALAX**—sounding tubes containing rubber. Kelom, Bottomley & Baird, Limited, Glasgow.
- 374,536. The word **HAWK**—golf balls. The North British Rubber Co., Limited, Fountainbridge, Edinburgh.
- 374,537. The word **OSPEL**—Same.
- 375,103. The word **GRIPPER**—steam and hydraulic packing. Robert Beldam, Limited, London, E. C.
- 375,104. The word **HINDOO**—Same.
- 375,105. The word **PERCH**—Same.
- 375,106. The word **ALLIED**—Same.
- 375,158. The word **NIDROC**—knapsacks, tarpaulins, tents, rick cloths, hose (tubular), packing (steam and hydraulic), waterproofing compound for textile garments, goods manufactured from rubber and gutta-percha. George Cording, Limited, London, W.

THE FRENCH REPUBLIC.

- 16,057. A trade mark composed of Chinese letters—for all kinds of rubber goods including wearing apparel. Audinet, Lacroix & Co., Lyons.
- 16,255. Monogram composed of letters **M. A. L. L. T.** enclosed in a large letter **O**—erasers and fountain pens of soft and hard rubber. M. Mallot, Paris.
- 162,532. The word **TRIPLEX**—hard rubber fountain pen, rubber erasers and other stationery supplies. Société Anonyme des Anciens Établissements. J. M. Paillat, Paris.
- 162,791. The word **AMITE**—rubber erasers. Same.
- 162,792. The word **VELOCE**—Same.
- 162,793. The word **ADAMS**—Same.
- 162,856. The words **FREE SKATE**—anti-skid devices for vehicle wheels. Paul Henriot, Paris.
- 162,896. Picture of open box showing contents comprising emery sheets, rubber and fabric patches, and a tube of rubber solution—tire repair kit. Victor Katz, Asnières.

- 162,908. The words **LE CACHALOT** and the picture of a cachalot whale, all within a double circle. Rubber-proofed garments. Madame Veuve Piazzio, Paris.
- 162,909. The words **LE CACHALOT**—Same.
- 162,953. The word **VELOCE**—rubber solution. Pierre Fernand Lespinasse, Paris.
- 162,999. The words **LA DILASOIE**—diluted rubber articles. M. Querville, Vincennes.
- 163,295. The words **LE GIGRIEUX**—anti-slip shoe-like device for use on crutches and wooden legs. Veuve Gagé Charlet, Paris.
- 163,350. The word **PROTECTAS**—rubber-proofed garments. Adolphe Schmwetsch, Paris.
- 163,356. The word **UNIC**—elastic bands of rubber and fabric. Alphonse De Bruyne, Paris.

NEW ZEALAND.

- 13,314. The word **AVON**—tires of india-rubber. The Avon India Rubber Co., Limited, Melksham, Wiltshire, England.
- 13,462. The word **BOOMERANG**—rubber tires, treads, and inner tubes. Barnett Glass Rubber Co., Limited, 289-294 Swanston street, Melbourne, Victoria, Australia.

DESIGNS.

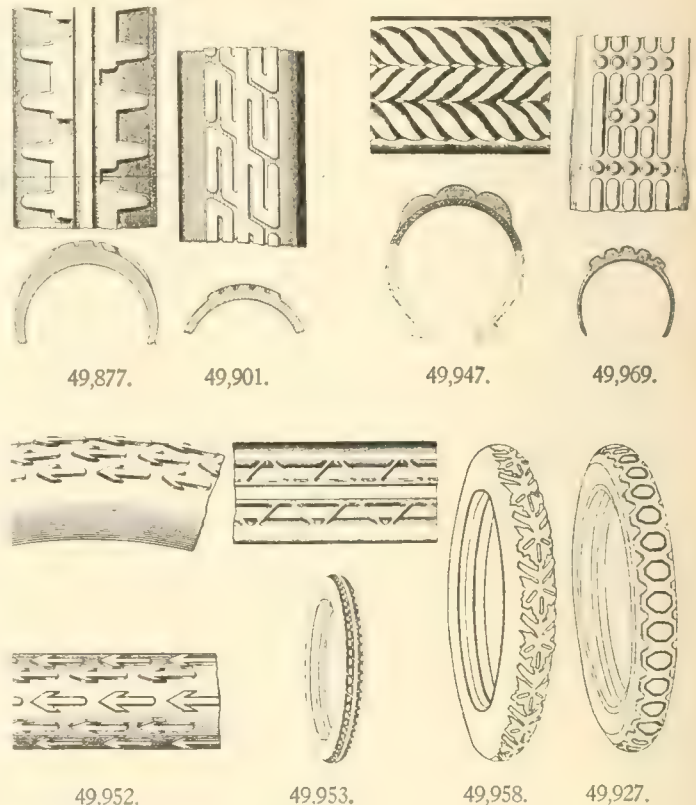
THE UNITED STATES.

- 49,905. Golf ball. Term 7 years. Patented November 14, 1916. P. A. Martin, Birmingham, England.

DESIGNS FOR TIRES.

THE UNITED STATES.

- 49,877. Pneumatic tire tread. Term 14 years. Patented November 14, 1916. P. B. Bosworth, assignor to The Victor Rubber Co.—both of Springfield, Ohio.
- 49,901. Elastic vehicle tire. Term 14 years. Patented November 14, 1916. O. J. Kuhlke, assignor to The Amazon Tire & Rubber Co.—both of Akron, Ohio.
- 49,927. Automobile tire. Term 14 years. Patented November 21, 1916. R. H. Keaton, San Francisco, Calif.



- 49,947. Tire tread. Term 7 years. Patented November 28, 1916. S. J. Bogan, Torrance, Calif.
- 49,952. Tire. Term 14 years. Patented November 28, 1916. G. Crowley, Hartford, Conn.
- 49,953. Tire tread. Term 14 years. Patented November 28, 1916. W. R. Denman, Akron, Ohio.
- 49,958. Tire. Term 3½ years. Patented November 28, 1916. O. W. Dunham and F. W. Willis, Toronto, Ontario, Canada.
- 49,969. Tread band for pneumatic tires. Term 14 years. Patented November 28, 1916. V. A. Parker, Akron, Ohio, assignor to The B. F. Goodrich Co., New York City.

Review of the Crude Rubber Market.

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NEW YORK.

PLANTATION rubber has been in good demand, particularly during the first two weeks of December, when heavy buying was indulged in by the larger manufacturing interests. Paras and Centrals moved freely in sympathy with the buying activity that was evidently in anticipation of the approaching holiday season. Prices had fluctuated considerably in the interim and gains were recorded in the entire list, with plantation leading the list. On December 14, first latex, spot, was 78 cents, an advance of 5 cents since the first of the month, and Upriver fine, spot, was 80 cents, an advance of about one cent since December 1. Africans and Centrals were in good demand and recorded substantial gains in prices. The last two weeks of the month were comparatively quiet, with trading confined to dealers and the usual routine business of small manufacturers. Inquiries were mostly confined to futures, and very little interest was shown in spot quotations. The dullness of the market was seasonable and therefore prices on all descriptions developed an easier tone during the closing week. On December 27, First latex, spot, was 76 cents, and Upriver fine, spot, 79 cents.

The S.S. "Tempaisan Maru" cleared from Seattle, Washington, for Vladivostok on December 17, with 1,111 tons of Brazilian Para rubber. This verifies to some extent the buying for Russian account that was reported in these columns November 1.

LONDON.

The forward movement that featured the December market was confined to plantations, as Paras failed to advance accordingly. The sharp advance in price was followed by heavy forward sales that apparently checked the buying movement. It was generally conceded that the submarine menace influenced the rising market strongly by showing the necessity of providing against possible curtailment of supplies. However, there are ample supplies in sight, which would normally check the advancing market were it not for the imminent shortage of tonnage that will promptly be reflected in the price of crude rubber. London imports for November were 6,118 tons, against 3,835 tons for October. Liverpool imports for November were 1,192 tons, against 1,143 tons for October. The reexports for November were as follows: London, 4,656 tons; Liverpool, 951 tons.

SINGAPORE.

There was a good demand for standard-grades at the auction held November 2, Pale crêpe and Ribbed smoked sheet bringing 59 cents and 58.6 cents, respectively. Of 628 tons offered, 452 tons were sold. The following week 770 tons were cataloged, and 454 tons sold in a strong market at advanced prices for the leading grades of about 3 cents a pound. On November 17 a record quantity of 948 tons were cataloged, but only 385 tons were sold, resulting in easier prices. Pale crêpe sold up to 62 cents, and Ribbed smoked sheet realized 59.5 cents. The average price for Plain smoked sheet was 54.8 cents.

The result of the auctions held December 1, 8, 15 and 21 was as follows: Pale crêpe averaged 65.4 cents and Smoked sheet 64.5 cents. The amount sold was 1,350 tons as compared with 1,827 tons a month ago.

BATAVIA.

The demand for spot rubber at the auction September 22 was good and prices advanced. Many holders took advantage of this and sold heavily before the auction. There were 12,835 pounds offered and 11,000 pounds sold. The auction of September 29 brought out 24,543 pounds of which 11,802 pounds were sold at advanced prices.

NEW YORK QUOTATIONS.

Following are the quotations at New York one year ago, one month ago, and December 29, the current date:

PARA.	Dec. 1, 1915.	Dec. 1, 1916.	Dec. 29, 1916.
Upriver, fine, new.....	68 @	78 @ 80	78 @
Upriver, fine, old.....	69 @	.....	.....
Islands, fine, new.....	65 @	71 @	70 @
Islands, fine, old.....	.....	.....	.....
Upriver, coarse, new....	58 @	59 @	53 @
Upriver, coarse, old....	.....	.....	.....
Islands, coarse, new....	33 @	31 @ 32	34 @
Islands, coarse, old....	.....	.....	.....
Cametá.....	35 @	32 @ 33	33 @
Caucho, ball, upper....	53 @	50 1/2 @ 51	54 @
Caucho, ball, lower....	56 @	47 @ 49	50 @
PLANTATION.			
First latex.....	{ Spot.. 75 @	{ Spot... 73 @	79 @
crêpe.....	{ Afloat.....	{ Futures 73 @	76 @
Amber crêpe, light.....	{ Spot... 71 @	{ Futures 71 @	75 @
			73 @
Brown crêpe, clean.....	{ Spot... 68 @	{ Futures 68 @	74 @
			69 @ 70
Smoked sheet, (Spot.. 75 @	{ Spot... 73 @		79 @
ribbed.....	{ Afloat.....	{ Futures 73 @	76 @
Fine sheets and biscuits, unsmoked.....	.....	.....	.....
CENTRAL.			
Corinto.....	52 @ 53	47 1/2 @	51 @
Esmeralda, sausage....	57 @ 55	47 @	50 @
Nicaragua, strip.....	53 @ 55	46 1/2 @ 47	48 @
Mexican plantation, sheet.....	.....	49 @ 50	49 @
Mexican, strip.....	53 @ 54	45 @ 46	48 @
Mexican, slab.....	.....	33 @ 34	34 @
Manicoba.....	.....	45 @	35 @ 36
Mangabeira, sheet.....	36 @ 39	40 @	36 @
Gravule.....	33 @ 35	37 @ 39	42 @ 44
Balata, sheet.....	56 @ 58	74 @	75 @
Balata, block.....	45 @ 46	65 @ 65 1/2	63 @
AFRICAN.			
Lopari, ball, prime....	65 @	62 @ 63	.....
Lopari, strip, prime....	.....	.....	.....
Upper Congo, ball, red.....	.....	.....	.....
Rio Nunez Niggers.....	63 @ 64	63 @ 64	62 @
Congo Niggers.....	60 @ 61	58 @ 60	60 @
Massai, red.....	.....	55 @ 57	60 @
Soudan, Niggers.....	.....	.....	.....
Cameroon, ball, soft....	.....	.....	.....
Cameroon, ball, hard....	.....	.....	.....
Benguela, No. 2, Superior.....	.....	40 @ 41	39 @
Benguela, No. 2.....	39 @ 40	39 @	34 @
Accra, flake.....	35 @ 37	23 @	30 @
EAST INDIAN.			
Assam.....	50 @ 54	49 @	.....
Pontianak.....	64 @ 7	8 1/2 @	8 1/2 @
Gutta Sial.....	11 1/4 @ 12	15 @	14 @
Gutta red Niger.....	.....	27 1/2 @	28 @
Borneo III.....	.....	.....	.....
Gutta Percha, red Macassa.....	1.85 @ 2.00	1.88 @ 2.00	1.90 @

COMPARATIVE NEW YORK PRICES FOR DECEMBER.

In regard to the financial situation, Albert B. Beers (broker in crude rubber and commercial paper, No. 68 William street, New York) advises as follows:

"The market for commercial paper has remained fairly steady through December, though with a slight stiffening in rates and some falling off in demand, especially from New York City banks. The best rubber names have continued selling at 4@4 1/2 per cent, and those not so well known 5@5 1/2 per cent."

	1916.*	1915.	1914.
Upriver, fine.....	\$0.78@0.81	\$0.68@0.87	\$0.70@0.76
Upriver, coarse.....	.47 @ .56	.57 @ .72	.51 @ .58
Islands, fine.....	.69 @ .72	.65 @ .80	.59 @ .70
Islands, coarse.....	.30 @ .34	.32 @ .45	.24 @ .34
Cametá.....	.31 @ .36	.35 @ .48	.34 @ .41

*Figured only to December 26.

MARKET CABLE SERVICE FROM LONDON.

The following reports of the weekly auctions held at London have been cabled by The Waterhouse Co., Limited, London:

Date.	Standard Crêpe.	Smoked Sheet.	Market.
December 11	80.70	80.70	There were buyers.
December 18	68.82	68.82	There were buyers.

MARKET CABLE SERVICE FROM SINGAPORE.

The following reports of the weekly auctions held at Singapore have been cabled by The Waterhouse Co., Limited:

Date.	Crêpe Price per lb.	Smoked Sheet Price per lb.	Pounds Sold.	Market.
December 1	66.3	63.3	1,093,120	Closed dull with less inquiry.
December 8	65.8	66.3	1,312,640	Good demand for all descriptions.
December 15	70.1	69.2	244,160	Very depressed; prices nominal.
December 21	59.5	59.5	374,080	Flat; there is scarcely any demand.

SINGAPORE.

GUTHRIE & CO., LIMITED, Singapore, report [November 9, 1916]: The quantity sold at this week's auction amounted to 450 tons out of 738 tons offered. There was a good demand yesterday, but on the continuation this morning it fell away somewhat and closes quiet. The only grade to show any change from yesterday was fine pale crêpe, one attractive parcel fetching \$147 per picul. Standard sheet sold up to \$145 and at this figure is \$7 higher on the week. Plain smoked sheet and un-smoked sheet were wanted, selling up to \$136 and \$134 respectively. The lower grades show an average increase of \$5 per picul. Scraps were neglected. The following was the course of values:

	In Singapore per picul.*	Sterling equivalent per pound in London.	Equivalent per pound in cents.†
Sheet, fine ribbed smoked....	\$139@145	2/8 3/4 @ 2/10	64.94 @ 67.40
Sheet, good ribbed smoked....	134@140	2/7 5/8 @ 2/ 8 3/4	62.71 @ 65.16
Sheet, plain smoked....	126@136	2/6 @ 2/ 8	59.48 @ 63.44
Sheet, ribbed unsmoked....	124@134	2/5 1/2 @ 2/ 7 3/8	58.49 @ 62.71
Sheet, plain unsmoked....	119@129	2/4 1/2 @ 2/ 6 3/8	56.51 @ 60.73
Crêpe, fine pale....	140@147	2/8 3/8 @ 2/10 1/4	65.16 @ 68.15
Crêpe, good pale....	134@139	2/7 5/8 @ 2/ 8 3/4	62.71 @ 64.94
Crêpe, fine brown....	126@134	2/6 @ 2/ 7 3/8	59.48 @ 62.71
Crêpe, good brown....	120@126	2/4 1/2 @ 2/ 6	57.02 @ 59.48
Crêpe, dark....	105@120	2/1 1/2 @ 2/ 4 3/4	50.57 @ 57.02
Crêpe, bark....	74@115	1/7 @ 2/ 3 3/8	37.66 @ 54.79
Scrap, virgin....	85@101	1/9 1/2 @ 2/ 0 1/4	42.37 @ 49.10
Scrap, pressed....	84@...	1/9 1/8 @ ...	41.87 @ ...
Scrap, louse....	75@ 86	1/7 1/4 @ 1/ 9 1/4	38.16 @ 42.61

* Picul = 133 1/3 pounds.

† Figured at standard rate of exchange, 1s. = 23.8 cents.
Quoted in S. S. dollars = 2/4 [56.7 cents]

PLANTATION RUBBER FROM THE FAR EAST.

TOTAL EXPORTS FROM MALAYA.

(From January 1, 1916, to dates named. Reported by Barlow & Co., Singapore. These figures include the production of the Federated Malay States, but not of Ceylon.)

	From Singapore. October 31, 1916.	From Malacca. September 30, 1916.	From Penang. September 30, 1916.	From Port Swettenham. October 23, 1916.	Totals.
to—					
United Kingdom.....	26,854,241	5,165,761	17,862,434	24,772,164	74,654,600
The Continent.....	2,422,003				2,422,003
Japan.....	44				44
United States.....	69,509,518		7,644,267	1,301,867	78,455,652
Others.....	268,800				268,800
Totals.....	110,110,958	5,165,761	26,038,434	27,484,095	168,799,248
Same period, 1915.....	66,782,158	6,159,464	21,338,264	24,988,802	119,268,688
Same period, 1914.....	32,919,222	3,579,164	15,948,133	24,840,136	77,286,655
Same period, 1913.....	21,830,702		11,334,533	22,244,550	55,409,785

EXPORTS OF CEYLON GROWN RUBBER.

(From January 1 to November 13, 1915 and 1916. Compiled by the Ceylon Chamber of Commerce.)

To—	1915.	1916.
United States.....	14,827,488	23,182,974
Canada and Newfoundland.....	384,940	6,720
France.....	497,892	1,501,037
Germany.....	332,200	248,874
Italy.....	118,270	18,666,268
United Kingdom.....	21,005,124	769,701
Australia.....	725,017	1,358
India.....	1,000	43,680
Straits Settlements.....	119,933	260,421
Others.....	38,154,015	44,840,561

(Same period 1914, 30,339,695 pounds; same period 1913, 21,990,065.) The export figures of rubber, given in the above table for 1914, include the imports re-exported. (These amount to 2,614,208 pounds from the Straits Settlements and 691,243 pounds from India.) To arrive at the total quantity of Ceylon rubber exported for that year deduct these imports from the total exports. The figures for 1915 and 1916 are for Ceylon rubber only.

FEDERATED MALAY STATES RUBBER EXPORTS.

An official cablegram from Kuala Lumpur gives the figures of the export of plantation rubber from the Federated Malay States during the month of November as 6,776 tons, against 5,968 tons in October last and 4,636 tons in the corresponding period last year. This gives a total of 57,046 tons for eleven months of the current year against 39,413 tons in 1915 and 27,336 tons in 1914. Appended are the comparative figures:

	1914.	1915.	1916.
January	1,473	1,473	1,471
February	2,418	3,411	5,207
March	2,418	3,418	4,429
April	2,151	2,777	3,914
May	2,069	2,708	3,956
June	2,306	3,403	5,114
July	2,971	3,687	5,053
August	1,850	3,796	5,782
September	2,879	3,984	6,376
October	2,897	4,120	5,968
November	2,889	4,636	6,776
Totals.....	27,336	39,413	57,046

STRAITS SETTLEMENTS RUBBER EXPORTS.

An official cablegram from Singapore states that the export of plantation rubber from Straits Settlements ports in the month of October amounted to 5,233 tons. This establishes a new record, the previous best being 5,106 tons in July. The export in September was 2,987 tons and in October, 1915, 2,641 tons. The total export for ten months of the present year is 40,184 tons as against 27,594 tons for the corresponding period last year and 15,023 tons in 1914. Appended are the comparative statistics:

	1914.	1915.	1916.
January	1,181	2,576	4,443
February	1,703	2,741	3,359
March	1,285	2,477	4,481
April	1,548	1,978	4,219
May	1,309	3,588	3,274
June	1,480	2,249	3,836
July	1,584	2,324	5,106
August	1,325	2,295	3,246
September	1,602	4,725	2,987
October	2,006	2,641	5,233
Totals.....	15,023	27,594	40,184

These figures include transshipments of rubber from various places in the neighborhood of the Straits Settlements such as Borneo, Java, Sumatra and the non-Federated Malay States but do not include rubber exports from the Federated Malay States.

IMPORTS AND EXPORTS OF RUBBER AND GUTTA AT SINGAPORE.*

IMPORTS.

October, 1916.

From—	Para Rubber.	Para for Rubber.	Treatment.	Borneo Rubber.	Gutta Percha.	Gutta Jelutong.
Malay Peninsula—						
Port Swettenham.....	1,188,133	32,000				
Muar	622,800					
Teluk Anson	569,997					
Penang	4,000	43,466				
Malacca	352,400	744,273				
Kelantan		5,733				
Port Dickson	70,533					
Kuantan	21,066					
Rengat	20,000	11,200				
Mersing	8,000					
Totals	1,897	7,967				

Borneo—						
Bandiarmassin	95,733	20,666	800	9,333	236,133	
Sarawak	87,066	22,533	400	10,800	479,600	
Pontianak	65,466		2,000	533	2,666	
Sambas	41,200				10,666	
Sibu	30,000		266	4,933	100,266	
Labuan	20,933		1,333		10,933	
Tessell	19,200	132,933			1,066	
Passir	14,000					
Sandakan	4,933	3,333				
Samarinda	3,200				4,133	
Sampit	2,666		1,333	4,000	166,666	
Singawang	1,866					
Kudat	1,000	30,800				
Totals	887,800	210,265	6,132	34,798	1,006,930	

CRUDE RUBBER ARRIVALS AT THE PORT OF NEW YORK.						
By the steamer <i>Dominic</i> from Pará:						
	Fine.	Medium.	Coarse.	Caucho.	Total.	
Meyer & Brown.....	89,100	2,500	8,000	36,000=	135,600	
Iaul Bertuch.....	222,000				222,000	
Arnold & Zeiss.....	107,100	6,200	14,700		128,000	
Davies, Turner & Co.....	97,700	10,400		13,100=	121,200	
H. A. Astlett & Co.....	44,100	8,600	47,900		100,600	
Pell & Dumont.....			22,500		22,500	
General Rubber Co.....	24,000	500	600	23,400=	25,100	
F. D. Duerr & Co.....	7,100		1,100	13,500=	21,700	
Henderson & Korn.....			16,500		16,500	
Totals	603,600	28,200	122,300	86,000=	840,100	

CRUDE RUBBER ARRIVALS AT THE PORT OF NEW YORK.

By the steamer *Dominic* from Pará:

	Fine.	Medium.	Coarse.	Caucho.	Total.
Meyer & Brown.....	89,100	2,500	8,000	36,000=	135,600
Iaul Bertuch.....	222,000				222,000
Arnold & Zeiss.....	107,100	6,200	14,700		128,000
Davies, Turner & Co.....	97,700	10,400		13,100=	121,200
H. A. Astlett & Co.....	44,100	8,600	47,900		100,600
Pell & Dumont.....			22,500		22,500
General Rubber Co.....	24,000	500	600	23,400=	25,100
F. D. Duerr & Co.....	7,100		1,100	13,500=	21,700
Henderson & Korn.....			16,500		16,500
Totals	603,600	28,200	122,300	86,000=	840,100

By the steamer *Francis* from Para and Manaos:

	Fine.	Medium.	Coarse.	Caucho.	Total.
Meyer & Brown.....	10,100	34,400			44,500
General Rubber Co.....	237,800	21,800	9,300	500=	269,400
Arnold & Zeiss.....	152,500	8,700	18,500	100=	179,800
H. A. Astlett & Co.....	70,000	38,200	18,600	4,700=	131,500
Pell & Dumont.....	44,700	18,800	32,400	300=	96,200
Aldens' Successors, Ltd.....	9,400		45,000		54,400
Davies, Turner & Co.....	49,300				49,300
Henderson & Korn.....			13,800	22,700=	36,500
Rosenthal & Sons.....		6,100	10,600		16,600
Totals	563,700	103,600	182,600	28,300=	878,200

By the steamer *Acre* from Para and Manaos:

	Fine.	Medium.	Coarse.	Caucho.	Total.
Meyer & Brown.....	58,100	14,700	23,500	1,200=	97,500
Henderson & Korn.....	109,500	4,800	19,200	47,600=	181,100
General Rubber Co.....	39,600	400	55,700		95,700
Davies, Turner & Co.....	56,000	6,200		8,800=	71,000
Muller, Schall & Co.....	64,300		1,100		65,400
Paul Bertuch.....	42,000	2,500	4,700	1,100=	50,300
Arnold & Zeiss.....	34,300	1,100	3,200		38,600
G. Amsinck & Co.....	19,100		3,600	9,500=	32,200
Pell & Dumont.....			31,000		31,000
Neuss, Hesslein & Co.....	17,600			7,800=	25,400
Raw Products Co.....	19,800	1,700	500		22,000
H. A. Astlett & Co.....			19,200		19,200
Aldens' Successors, Ltd.....	1,200	1,200	12,400		14,800
Hagemeyer & Brunn.....	1,300		1,200	1,200=	3,700
Various.....	2,700	200	100	1,300=	4,300
Totals	465,500	32,800	175,400	78,500=	752,200

By the steamer *Rio de Janeiro* from Para and Manaos:

	Fine.	Medium.	Coarse.	Caucho.	Total.
Meyer & Brown.....	45,000	2,400	2,800		50,200
Muller, Schall & Co.....	60,200	6,500	19,000	1,800=	87,500
Aldens' Successors, Ltd.....	1,200	14,000	18,000		33,200
Arnold & Zeiss.....	8,000	400	20,000		28,400
Pell & Dumont.....	900	400	24,100		25,400
Crossman & Sielcken.....				11,600=	13,600
H. A. Astlett & Co.....	1,800		11,300		13,100
Various.....	2,700	400	1,200	200=	4,500
Totals	119,800	24,100	97,400	13,600=	255,900

EXPORTS.						
October, 1916.						
To	Para Rubber		Gutta		Gutta	
	Rubber.	shipped.	Rubber.	Percha.	Jelutong.	
NORTH AMERICA						
United States—						
New York.....	2,218,700	678,400				
Akron.....						
San Francisco.....						
Boston.....						
Seattle.....						
Canada—						
Ontario (Toronto).....						
Totals	6,121,066	1,061,065		98,933	1,595,633	
EUROPE:						
United Kingdom						
England—						
Liverpool.....	213,066	233,733		56,266	121,260	
London.....				102,540	67,090	
Russia (Vladivostok).....	538,266					
France (Marseilles).....						
Totals	980,532	1,123,199		181,739	188,350	
Grand Totals	7,101,598	2,184,264		280,672	1,784,433	

*Not complete. Includes all arrivals from October 1 to October 11, inclusive, not received at this office.

PARAS.		POUNDS.
NOVEMBER 17.—By the <i>Hostilius</i> =Montevideo:		
A. D. Straus & Co. (Fine).....	20,000	
CENTRAIS		
[*This sign, in connection with imports of Centrals, denotes Guayule rubber.]		
NOVEMBER 23.—By the <i>Advance</i> =Colon:		
G. Amsinck & Co. (Caucho).....	19,500	
NOVEMBER 23.—By the <i>Amazon</i> =Colon:		
G. Amsinck & Co. (Fine).....	18,000	
G. Amsinck & Co. (Coarse)....	2,000	
G. Amsinck & Co. (Caucho)....	54,000	
Muller, Schall & Co. (Fine).....	20,500	
Muller Schall & Co. (Coarse)...	1,000	
Muller Schall & Co. (Caucho)..	2,500	
Neuss, Hesslein & Co. (Fine)...	7,000	
Neuss, Hesslein & Co. (Coarse)..	1,000	106,000
NOVEMBER 28.—By the <i>Panama</i> =Colon:		
G. Amsinck & Co. (Fine).....	4,000	
G. Amsinck & Co. (Coarse).....	2,500	
Muller Schall & Co. (Fine)....	10,000	
Muller Schall & Co. (Coarse)...	6,000	
W. R. Grace & Co. (Fine)....	2,000	24,500
NOVEMBER 17.—By the <i>Santa Marta</i> =Cartagena:		
G. Amsinck & Co.....	6,800	
A. Held.....	200	7,000

NOVEMBER 17.—By the <i>Panama</i> =Colon:			Pounds.
G. Amsinck & Co.....	4,000		
A. Rosenthal & Sons.....	500	4,500	
NOVEMBER 22.—By the <i>Metapan</i> =Port Limon:			
A. A. Linde & Co.....	1,000		
NOVEMBER 23.—By the <i>Advance</i> =Colon:			
G. Amsinck & Co.....	4,000		
NOVEMBER 23.—By the <i>Amazon</i> =Colon:			
G. Amsinck & Co.....	29,500		
Otto Gerdau	13,000		
Neuss, Hesslein & Co.....	4,800		
A. M. Capen's Sons.....	5,200		
American Trading Co.....	5,300		
Harburger & Stack.....	800		
W. R. Grace & Co.....	2,300		
Lawrence Johnson & Co.....	3,000		
Andean Trading Co.....	4,300		
J. S. Sembrada & Co.....	38,500		
Pablo, Calvet & Co.....	33,100		
P. A. Andrade Sons.....	4,400		
Various	10,000	154,200	
NOVEMBER 24.—By the <i>Preston</i> =Colombia:			
G. Amsinck & Co.....	2,000		
NOVEMBER 28.—By the <i>Monterey</i> = Mexico:			
U. S. Brokerage Co.....	600		

	POUNDS.	
P. Tremari Successors.....	800	
General Export & Commission Co.....	200	1,600
NOVEMBER 28.—By the <i>Panama</i> =Colon:		
G. Amsinck & Co.....	17,000	
Dumarest Bros.....	4,700	
Pablo, Calvet & Co.....	6,200	27,900
NOVEMBER 28.—By the <i>Monterey</i> =Mexico:		
C. Tennant Sons & Co.....		*12,000
NOVEMBER 28.—By the <i>Pastores</i> =Port Limon:		
Isaac Brandon & Bros.....	1,000	
Fernandez Sons Co.....	500	
G. Amsinck & Co.....	200	1,700
NOVEMBER 28.—By the <i>Panama</i> =Colon:		
G. Amsinck & Co.....		1,500
NOVEMBER 28.—By the <i>Panama</i> =Colon:		
A. Rosenthal & Sons.....	3,500	
J. S. Sembrada & Co.....	800	24,100
W. R. Grace & Co.....	1,500	8,000
NOVEMBER 28.—By the <i>Panama</i> =Colon:		
G. Amsinck & Co.....	8,500	
Pablo, Calvet & Co.....	7,600	
A. M. Capen's Sons.....	4,200	
H. Wolff & Co.....	3,000	
W. R. Grace & Co. (Coarse).....	2,500	
G. Amsinck & Co. (Coarse).....	2,500	
J. S. Sembrada & Co.....	800	29,100

			Pounds.				Pounds.
DECEMBER 8.—By the <i>Carman</i> =Cartagena:				W. H. Stiles & Co.....			33,500
G. Amsinck & Co.....	1,000			Arnold & Zeiss			17,000
DECEMBER 9.—By the <i>Julius</i> =Cottet:				Various			10,000 480,500
R. G. Barthold	700			N O V E M B E R 27.—By the <i>Vol</i> =London:			
G. Amsinck & Co.....	300	1,000		The B. F. Goodrich Co.....			125,000
DECEMBER 11.—By the <i>Esperanza</i> =Mexico:				L. Littlejohn & Co.....			80,000
H. Marquard & Co.....	1,000			Robinson & Co.....			100,000
J. A. Medina & Co.....	500	1,500		General Rubber Co.....			250,000
DECEMBER 12.—By the <i>Port</i> =Port Limer:				Goodyear Tire & Rubber Co..			70,000
Isaac Bonon & Bros.....	1,000			Hagemeyer Trading Co.....			22,000
Legros & Hainlein	100			J. T. Johnstone & Co.....			180,000
Fruit Despatch Co.....	100	1,200		Arnold & Zeiss.....			115,000
DECEMBER 12.—By the <i>Colon</i> =Colon:				Various			22,000 964,000
G. Amsinck & Co.....	15,000			N O V E M B E R 27.—By the <i>Port Hardy</i> =London:			
L. Tous & Co.....	5,200			Meyer & Brown.....			40,000
Piza Nephews & Co.....	4,000			W. H. Stiles & Co.....			30,000
Andean Trading Co.....	2,500			Edward Maurer & Co., Inc....			36,000
American Trading Co.....	2,500			The B. F. Goodrich Co.....			80,000
Lawrence Johnson & Co.....	700			Michelin Tire Co.....			90,000
Various	1,200	31,100		J. T. Johnstone & Co.....			240,000
AFRICANS.				Arnold & Zeiss.....			75,000
N O V E M B E R 20.—By the <i>Carmania</i> =Liverpool:				Robinson & Co.....			80,000
Arnold & Zeiss.....	22,500			General Rubber Co.....			115,000
Hagemeyer Trading Co.....	17,000	39,500		Aldens' Successors, Ltd.....			725,000
N O V E M B E R 20.—By the <i>Lepanto</i> =Hull:				Raw Products Co.....			22,500
Rubber Trading Co.....	22,500			L. Littlejohn & Co.....			100,000 1,668,500
N O V E M B E R 21.—By the <i>Andria</i> =Havre:				N O V E M B E R 27.—By the <i>Kumeric</i> =Colombo:			
Various	3,000			Meyer & Brown.....			245,000
N O V E M B E R 21.—By the <i>Penmorvan</i> =Havre:				L. Littlejohn & Co.....			320,000
Various	33,500			Arnold & Zeiss			125,000
N O V E M B E R 23.—By the <i>Francisco</i> =Hull:				W. H. Stiles & Co.....			22,500
Alden's Successors, Ltd.....	54,000			Robinson & Co.....			45,000
Robert Badenhop & Co., Inc....	20,000	74,000		J. T. Johnstone & Co.....			22,500
N O V E M B E R 27.—By the <i>Philadelphia</i> =Liverpool:				Charles T. Wilson Co., Inc....			16,000
Goodyear Tire & Rubber Co.....	45,000			Aldens' Successors, Ltd.....			11,200
N O V E M B E R 27.—By the <i>Pannonia</i> =London:				Goodyear Tire & Rubber Co..			15,000
J. T. Johnstone & Co.....	22,000			Edward Maurer & Co., Inc....			9,000
N O V E M B E R 28.—By the <i>Laconia</i> =Liverpool:				Various			50,000 881,200
Fred Stern & Co.....	35,000			N O V E M B E R 27.—By the <i>Pannonia</i> =London:			
DECEMBER 1.—By the <i>L. F. Lemicks</i> =Lisbon:				The B. F. Goodrich Co.....			225,000
Various	90,000			Firestone Tire & Rubber Co..			225,000
DECEMBER 4.—By the <i>Celina</i> =Liverpool:				J. T. Johnstone & Co.....			25,000
Meyer & Brown	11,500			Hagemeyer Trading Co.....			11,000
Henderson & Korn	6,000			Raw Products Co.....			4,500 490,500
Edward Maurer & Co., Inc....	4,000	21,500		N O V E M B E R 28.—By the <i>Laconia</i> =Liverpool:			
DECEMBER 4.—By the <i>St. Louis</i> =Liverpool:				Fred Stern & Co.....			5,000
Goodyear Tire & Rubber Co.....	22,500			N O V E M B E R 28.—By the <i>Suruga</i> =Singapore:			
DECEMBER 4.—By the <i>Irvington</i> =Cottet:				Meyer & Brown			65,000
Various	11,000			General Rubber Co.....			170,000
DECEMBER 4.—By the <i>Penistone</i> =Bordeaux:				H. R. Jefferts.....			11,000
Robert Badenhop & Co., Inc....	33,000			Edward Maurer & Co., Inc....			85,000
Rubber Trading Co.....	11,200	44,200		L. Littlejohn & Co.....			600,000
DECEMBER 5.—By the <i>Eastgate</i> =Havre:				Robert Badenhop & Co., Inc....			60,000
Various	12,000			Henderson & Korn.....			475,000
DECEMBER 8.—By the <i>Baltic</i> =Liverpool:				Fred Stern & Co.....			50,000
Henderson & Korn	12,500			J. T. Johnstone & Co.....			225,000
DECEMBER 8.—By the <i>Finland</i> =Liverpool:				Fox & Co.....			27,000
Edward Maurer & Co., Inc....	11,000			Goodyear Tire & Rubber Co..			165,000
DECEMBER 11.—By the <i>Orduna</i> =Liverpool:				Robinson & Co.....			300,000
Rubber Trading Co.....	11,200			East Asiatic Co.....			90,000
Arnold & Zeiss.....	95,000			Aldens' Successors, Ltd.....			30,000
Hagemeyer Trading Co.....	25,000	131,200		Rubber Trading Co.....			30,000
MANICOBAS.				Arnold & Zeiss.....			80,000
N O V E M B E R 24.—By the <i>Dominic</i> =Ceara:				Charles T. Wilson Co., Inc....			60,000
Various	66,000			W. R. Grace & Co.....			60,000 2,583,000
N O V E M B E R 28.—By the <i>Laconia</i> =Liverpool:				DECEMBER 1.—By the <i>Howick Hall</i> =Colombo:			
Arnold & Zeiss	45,000			Meyer & Brown.....			35,000
DECEMBER 1.—By the <i>Rio de Janeiro</i> =Pernambuco:				L. Littlejohn & Co.....			265,000
A. J. Hutter, Inc.	10,000			W. H. Stiles & Co.....			110,000
PLANTATIONS.				Arnold & Zeiss.....			140,000
N O V E M B E R 20.—By the <i>Carmania</i> =Liverpool:				Various			60,000 610,000
Arnold & Zeiss	13,500			DECEMBER 4.—By the <i>Philadelphian</i> =London:			
The B. F. Goodrich Co.....	1,500	15,000		General Rubber Co.....			120,000
N O V E M B E R 21.—By the <i>Minnehaha</i> =London:				Fred Stern & Co.....			16,000
L. Littlejohn & Co.....	115,000			Charles T. Wilson Co., Inc....			25,000
Arnold & Zeiss.....	115,000			Raw Products Co.....			11,000
Rubber Trading Co.....	70,000	300,000		L. Littlejohn & Co.....			9,000
N O V E M B E R 23.—By the <i>City of Glasgow</i> =Colombo:				W. H. Stiles & Co.....			2,000 183,000
Meyer & Brown.....	240,000			DECEMBER 4.—By the <i>Wakasa Maru</i> =Singapore:			
L. Littlejohn & Co.....	180,000			Meyer & Brown.....			40,000
				Henderson & Korn			335,000
				Robert Badenhop & Co., Inc....			45,000
				Fox & Co.....			35,000
				Fred Stern & Co.....			30,000
				Arnold & Zeiss.....			100,000
				W. R. Grace & Co.....			11,000
				Edward Maurer & Co., Inc....			5,000
				United Malaysian Rubber Co..			11,200
				East Asiatic Co.....			45,000
				J. T. Johnstone & Co.....			115,000
				L. Littlejohn & Co.....			265,000
				Rubber Trading Co.....			7,000
				Charles T. Wilson Co., Inc....			110,000
				Robinson & Co.....			70,000
				Goodyear Tire & Rubber Co..			50,000 1,274,200
				DECEMBER 11.—By the <i>Lancastrian</i> =London:			
				Goodyear Tire & Rubber Co..			225,000
				Fred Stern & Co.....			135,000
				Michelin Tire Co.....			100,000
				L. Littlejohn & Co.....			35,000
				Rubber Trading Co.....			9,000 504,000
				DECEMBER 11.—By the <i>Orduna</i> =Liverpool:			
				Arnold & Zeiss.....			4,500
				The B. F. Goodrich Co.....			4,500 9,000
				DECEMBER 12.—By the <i>Neve</i> =Colombo:			
				Meyer & Brown.....			460,000
				L. Littlejohn & Co.....			330,000
				W. H. Stiles & Co.....			100,000
				Arnold & Zeiss			90,000
				W. R. Grace & Co.....			45,000
				Goodyear Tire & Rubber Co..			33,600
				Robinson & Co.....			25,000
				J. T. Johnstone & Co.....			85,000
				Aldens' Successors, Ltd.....			13,500
				Charles T. Wilson Co., Inc....			13,500
				Edward Maurer & Co., Inc....			9,000
				Henderson & Korn.....			25,000
				Various			110,000 1,339,600
				DECEMBER 12.—By the <i>Malaya</i> =London:			
				L. Littlejohn & Co.....			230,000
				Hagemeyer Trading Co.....			25,000
				Raw Products Co.....			7,000
				The B. F. Goodrich Co.....			350,000
				Firestone Tire & Rubber Co..			110,000
				Arnold & Zeiss.....			160,000
				Edward Maurer & Co., Inc....			160,000
				W. H. Stiles & Co.....			11,000
				General Rubber Co.....			60,000
				Robinson & Co.....			25,000 1,138,000
				CRUDE RUBBER ARRIVALS AT SEATTLE.			
				Consignee is given first, followed by shippers.			
				Figured 130 pounds net to the case.			
				PLANTATION.			
				TO AKRON.			
				N O V E M B E R 28.—By the steamer <i>Chicago Maru</i> .			
				Firestone Tire & Rubber Co..			
				The Waterhouse Co.....			132,340
				TO SEATTLE.			
				DECEMBER 2.—By the steamer <i>Ara Maru</i> .			
				Nippon Yusen Kaisha.....			
				Nippon Yusen Kaisha			1,300
				W. R. Grace & Co.....			
				Sandilands Buttery & Co....			260 1,560
				TO SEATTLE.			
				DECEMBER 14.—By the <i>Sakai Maru</i> .			
				Firestone Tire & Rubber Co..			
				The Waterhouse Co.....			41,158
				Henderson & Korn.....			
				East Asiatic Co.....			16,380
				Goodyear Tire & Rubber Co..			
				The Waterhouse Co.....			4,380 61,918
				TO AKRON.			
				DECEMBER 14.—By the <i>Talithus</i> .			
				H. B. M. Consul General.....			
				Wadleigh & Co.....			465,920
				Harrisons & Crofield.....			335,920
				The Waterhouse Co.....			271,700
				Anglo-Malay Rubber Co.....			34,320
				Rubber Estates of Johore...			23,140
				Duff Development Co.....			14,950
				Anglo-Sumatra Rubber Co..			5,460 1,151,410
				TO NEW YORK.			
				H. B. M. Consul General.....			
				Planters Stores & Agency Co.			9,100
				Aylesburg & Nutter.....			6,370
				Runban Estate			4,940
				Kuala Kal Kuantan Rubber Co., Ltd.....			4,290
				Kuali Pahi Rubber Estate, Ltd.....			2,730 27,430

TO SEATTLE.

	POUNDS.	VALUE.
H. B. M. Consul General.		
W. T. Easley	411,190	
C. W. Mackie & Co.	47,060	
George Stuart & Co.	10,530	
Cumberbatch, Ltd.	9,100	
Whittall & Co.	4,550	
Third Mile Rubber Co.	4,550	
Glensheil Rubber Estate Co.	2,470	
Sungie Purun Rubber Estate	2,470	
Sheras Rubber Estate.	2,470	
Tanaga Batu Rubber Co.	1,820	
Wadleigh & Co.	130	
Butterfield & Swire	130	496,470

TO SEATTLE.

December 15—By the steamer <i>Canada Maru</i> —	
W. R. Grace & Co.	
Penang Rubber Estates Co.	11,050

GUTTA JELUTONG.

TO SAN FRANCISCO.

December 14.—By the steamer <i>Sakai Maru</i> .	
H. B. M. Consul General.	
Borneo Surnaba Trading Co.	5,460

TO SEATTLE.

L. Littlejohn & Co.	
Katz Bros	49,660

CUSTOM HOUSE STATISTICS.

PORT OF SAN FRANCISCO OCTOBER, 1916.

IMPORTS:	POUNDS.	VALUE.
India rubber	556,076	\$303,509
Manufactures of gutta percha		20
Gutta jelutong (Pontianak).	38,243	1,877
Rubber scrap	500	90
Manufactures of india rubber		113
Totals	594,819	\$305,609
EXPORTS:		
Reclaimed rubber	6,091	\$579
India rubber boots.....pairs	532	3,613
India rubber shoes.....pairs	3,607	2,852

	POUNDS.	VALUE.
Automobile tires		\$85,646
Other rubber tires.....		21,981
Belting, hose, etc.		28,392
All other manufactures of india rubber		9,362
Total		\$152,425

PORT OF BOSTON—NOVEMBER, 1916.

IMPORTS:	POUNDS.	VALUE.
India rubber	254,982	\$99,041
Rubber scrap	230,605	7,300
Manufactures of india rubber		4,875
Totals	485,587	\$111,216

EXPORTS:	POUNDS.	VALUE.
Rubber scrap	1,007	\$302
India rubber boots.....pairs	29,781	62,469
India rubber shoes.....pairs	178,422	7,447
Automobile tires		1,448
Other rubber tires.....		27
Belting, hose, etc.		1,494
All other manufactures of india rubber		17,451
Total		\$162,598

PORT OF CLEVELAND—NOVEMBER, 1916.

IMPORTS:	POUNDS.	VALUE.
Manufactures of india rubber		\$104
EXPORTS:		
India rubber	1,888	330
Rubber scrap		319
Manufactures of india rubber		
Totals		\$162,598

IMPORTS:	POUNDS.	VALUE.
India rubber	2,277,668	\$1,142,588
EXPORTS:		
India rubber		1,425
Automobile tires		5,731
Other rubber tires.....		33,486
Other manufactures of india rubber		1,396
Total		\$56,372

	POUNDS.	VALUE.
IMPORTS:		
Rubber scrap	200,203	\$13,090

EXPORTS:	POUNDS.	VALUE.
Rubber scrap	35,068	\$2,976
India rubber boots.....pairs	5,692	14,796
India rubber shoes.....pairs	204	220
Automobile tires		11,262
Belting, hose, etc.		1,052
All other manufactures of india rubber		6,286
Total		\$36,592

IMPORTS:	POUNDS.	VALUE.
India rubber	25,057	\$9,398

IMPORTS:	POUNDS.	VALUE.
India rubber	14,356,597	\$7,488,172
Rubber scrap		143,114
Gutta jelutong (Pontianak)....	1,252,229	89,021
Rubber boots		74,029
Manufactures of india rubber		6,911
Total		\$7,732,245

EXPORTS:	POUNDS.	VALUE.
Balata		\$1,111
Rubber scrap		42,640
Reclaimed rubber	72,276	11,267
Indian rubber boots.....pairs	109,747	350,705
Indian rubber shoes.....pairs	19,078	12,406
Automobile tires		679,948
Other rubber tires.....		98,128
Belting, hose, etc.		143,020
All other manufactures of india rubber		423,214
Total		\$1,775,471

IMPORTS:	POUNDS.	VALUE.
Manufactures of india rubber		\$29
EXPORTS:		
Automobile tires		\$66,609
Belting, hose, etc.		3,293
All other manufactures of india rubber		6,380
Total		\$76,282

EXPORTS OF INDIA RUBBER FROM PARA AND MANAOS DURING NOVEMBER, 1916.

NEW YORK.

EUROPE.

EXPORTERS.	Fine.	Medium.	Coarse.	Caucho.	TOTALS.	Fine.	Medium.	Coarse.	Caucho.	TOTALS.	GRAND TOTALS.
J. Marques	148,567	13,312	68,269	42,176	272,324						272,324
Stowell & Co.	71,070	3,642	18,046		92,758	79,007	5,350	2,137		128,069	220,827
Suarez Hermanos & Co., Ltd.	134,101	216	5,321	37,136	176,774				22,033	22,033	198,807
General Rubber Co. of Brazil....	76,957	4,579	37,916	932	120,384	21,420	1,020		1,132	23,572	143,956
Adelbert H. Alden, Ltd.	680	7,223	13,748		21,651	82,283			7,852	90,135	111,786
Pires Teixeira & Co.	41,070	3,275	16,690	1,712	62,747	26,866	511			27,370	90,117
Berringer & Co.	11,815		519	3,700	16,034						16,034
G. Fradelizi & Co.	10,705	965	821	100	12,591						12,591
Seligmann & Co.	8,594	92	437	2,592	11,765						11,765
Sundries	4,395	1,190	21,313	12,926	39,324	3,850	769	557	32,636	37,812	77,136
Exports from Manaos	507,954	34,494	183,130	100,774	826,352	213,420	7,649	2,694	105,228	329,991	1,155,343
Exports from Iquitos	323,393	56,634	95,335	4,362	479,724	395,361	41,579	11,775	8,442	576,748	1,056,472
Totals, November, 1916	831,347	91,128	278,465	105,136	1,306,076	777,886	60,979	59,652	330,117	1,228,634	2,534,710
October, 1916	534,595	27,873	32,933	266,489	861,890	970,163	106,884	480,473	156,071	1,713,591	2,575,481
September, 1916	869,014	90,689	329,205	75,342	1,364,250	639,662	39,313	27,798	193,476	900,249	2,264,499

EXPORTS OF INDIA RUBBER FROM MANAOS DURING NOVEMBER, 1916.

NEW YORK.

EUROPE.

EXPORTERS.	Fine.	Medium.	Coarse.	Caucho.	TOTALS.	Fine.	Medium.	Coarse.	Caucho.	TOTALS.	GRAND TOTALS.
Stowell & Co.	72,729	4,125	9,214	41	86,109				12,466	12,466	98,575
General Rubber Co. of Brazil....	121,672	15,132	32,961	235	170,000	104,906	10,530	3,630	55,934	175,000	345,000
Adelbert H. Alden, Ltd.		4,250	20,181		24,431	170,691	13,017	25	48,378	232,111	256,542
Tancredi Porto & Co.	92,592	27,173	29,248	2,607	151,620	88,522	15,210	2,140	9,136	115,008	266,628
Ohliger & Co.	112,578	6,009	23,696	6,413	148,696						148,696
J. G. Araujo	10,400	2,880	5,280		18,560	25,162	596	1,389	1,812	28,959	47,519
Amorim Irmaos						6,080	2,179	3,281	280	11,820	11,820
W. Peters	2,170	1,080	600	2,004	5,854						5,854
Theodore Levy, Camille & Co.							38	1,310		1,348	1,384
Totals	412,141	60,694	120,180	11,300	605,270	395,361	41,570	11,775	128,042	576,748	1,182,018
In transit Iquitos						204,626	11,760	45,183	61,326	322,895	322,895
Totals, November, 1916	412,141	60,694	120,180	11,300	605,270	599,987	53,330	56,958	189,368	899,643	1,504,913
October, 1916	211,804	51,370	101,151	12,933	377,258	379,338	25,247	16,464	139,758	550,207	927,465
September, 1916	259,336	36,882	72,767	23,185	392,170	351,246	33,813	9,713	138,625	533,397	925,567
August, 1916	435,992	47,117	84,672	24,754	592,535	272,281	20,604	10,127	258,293	561,305	1,153,840
July, 1916	238,014	21,593	31,284	204,740	495,631	68,650	43,932	18,914	269,029	400,525	896,150
January to June, 1916	2,537,504	410,024	996,427	1,438,355	5,382,310	1,450,817	313,896	242,475	1,240,885	3,248,073	8,630,383

(Compiled by Stowell & Co., Manaos.)

IMPORTS AND EXPORTS OF CRUDE AND MANUFACTURED RUBBER AT THE PORT OF NEW YORK.

IMPORTS.

Week Ending—	Latex, Rejected		Scrap for Re-manufacture.		Balata.		Gutta, Peta.		Gutta Jelutong.	
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
November 25, 1916.....		\$1,426*								
December 1, 1916.....		1,499,149	429,012	\$32,702			1,733	\$300	22,370	\$2,672
December 8, 1916.....	5,122,247	2,654,454	542,325	37,847	45,386	\$21,878				
December 15, 1916.....	7,848,067	4,219,346	255,875	18,106	39,750	23,240	115,126	13,087		
	514,657		190,915	13,800	179,062	93,075	2,448	243		
					\$23,011.					

Manufactures of India Rubber.

EXPORTS.

RECEIVED FROM NIMH LIBRARY DECEMBER 23, 1916.

RUBBER STATISTICS FOR THE UNITED STATES.

IMPORTS OF CRUDE AND MANUFACTURED RUBBER.

	September, 1916.	
	Pounds.	Value.
UNMANUFACTURED—free		
India rubber:		
From—		
France	7,753	\$2,846
Portugal		
United Kingdom	966,341	967,162
Central America and British Honduras	121,264	55,024
Mexico	68,008	30,737
Brazil	4,492,914	2,128,985
Other South America	344,745	125,227
East Indies	11,092,447	6,156,142
Other countries	44,483	8,367
Totals	18,595,917	\$9,474,490
Balata	29,378	106,258
Guayule gum	244,940	67,295
Gutta jelutong	1,117,146	53,120
Gutta percha	585,535	235,993
Totals	20,762,916	\$9,937,156
Rubber scrap	736,245	51,470
Totals, unmanufactured	21,499,161	\$9,988,626
Chicle	682,586	\$312,891
MANUFACTURED—dutiable		
Gutta percha		\$35,871
India rubber		47,844
Totals, manufactured		\$83,715
Substitutes—elasticon, etc..		

EXPORTS OF DOMESTIC MERCHANDISE.

	September, 1916.	
	Pounds.	Value.
MANUFACTURED—		
Automobile tires:		
To—		
†Russia in Europe		\$596
England		72,465
Canada		66,180
Mexico		8,577
Cuba		62,626
Australia		56,067
New Zealand		24,999
Philippine Islands		19,506
Other countries		306,198
Total		\$617,214
All other tires		136,323
Belting, hose and packing		247,114
Rubber boots		43,789
Rubber shoes		362,853
Scrap and old rubber		628,749
Reclaimed rubber		219,017
Other rubber manufactures		630,288
Totals, manufactured		\$1,990,316
Fountain pens	21,323	\$15,412

EXPORTS OF FOREIGN MERCHANDISE.

	September, 1916.	
	Pounds.	Value.
UNMANUFACTURED—		
Balata	135,307	\$67,254
Guayule gum		
Gutta jelutong		
Gutta percha		
India rubber	384,114	157,001
Rubber scrap and refuse		
Totals, unmanufactured	519,421	\$254,345
Chicle	262,184	\$95,933
MANUFACTURED		
Gutta percha		
India rubber		\$219
Totals, manufactured		\$219

EXPORTS OF RUBBER GOODS TO NON CONTIGUOUS TERRITORIES OF THE UNITED STATES.

	September, 1916.	
	Pounds.	Value.
Belting		\$12,029
Boots and shoes	15,979	30,839
Other		7,047
Total		\$49,915
Hawaii:		
Belting		\$5,960
Automobile tires		56,340
Other		7,074
Total		10,413
Total		\$79,787
Philippine Islands:		
Belting, hose and packing		\$2,708
Boots and shoes	37,771	28,835
Tires		32,054
Other rubber goods		10,901
Total		\$74,498
To—		
Porto Rico:		
Belting, hose and packing		\$3,764
Automobile tires		61,191
Other tires		923
Other rubber goods		12,999
Total		\$78,877

*Dutiable beginning July 1, 1916.

†Not separately stated prior to January 1, 1916.

RUBBER STATISTICS FOR THE DOMINION OF CANADA.

IMPORTS OF CRUDE AND MANUFACTURED RUBBER.

	September, 1916.	
	Pounds.	Value.
UNMANUFACTURED—free		
Rubber and gutta percha, crude caoutchouc or india rubber:		
From—		
Great Britain	411,991	\$224,467
United States	349,139	163,254
Totals	761,130	\$387,721
Rubber, recovered:		
From—		
United States	200,506	\$19,931
Hard rubber, in sheets and rods:		
From—		
United States	496	\$498
Rubber substitute:		
From—		
United States	26,614	\$2,411
Rubber, powdered, and rubber or gutta percha waste:		
From—		
United States	56,431	\$1,583
Other countries	47,049	3,411
Totals	103,480	\$4,994
Rubber thread, not covered:		
From—		
United States	3,082	\$4,482
Balata, crude:		
From—		
United States	965	\$791
Chicle, crude:		
From—		
United States	121,160	\$56,106
British Honduras	464,571	168,225
Mexico	69,081	26,098
Totals	654,812	\$250,409

September, 1916.

General Preferential
Tariff. Tariff.
Value. Value.

	September, 1916.	
	Pounds.	Value.
Belting:		
United States		\$13,187
Other		
Automobile tires:		
United States		\$75
Other		20,146
Total		\$20,221
Hose, lined with rubber:		
United States		\$10,818
Other		
Packing:		
United States		\$4,748
Tires of rubber for all vehicles:		
From—		
United States		\$90,826
France		668
Total		\$91,494
Rubber cement, and all other manufactures of india rubber and gutta percha, N. O. P.:		
From—		
Great Britain		\$296
United States		52,442
Other countries		550
Total		\$53,288
Hard rubber in tubes:		
From—		
United States		\$1,401
Webbing—over one inch wide:		
From—		
United States		\$24,968

EXPORTS OF DOMESTIC AND FOREIGN RUBBER GOODS.

	September, 1916.	
	Prod- uce of Canada. Value.	Re-exports of Foreign Goods. Value.
MANUFACTURED		
Belting:		
To—		
United States		\$11
Newfoundland	\$226	
Other countries	146	
Totals	\$372	\$11
Hose—		
To—		
Great Britain	\$13,764	
United States	28	\$24
Newfoundland	346	
Other countries	4,828	
Totals	\$18,966	\$24
Boots and shoes:		
To—		
Great Britain	\$58,272	
Newfoundland	8,680	
Australia	2,505	
New Zealand	3,309	
Other countries	6,271	
Total	\$79,037	

EXPORTS OF DOMESTIC AND FOREIGN RUBBER GOODS.

Tires:	Value.	Value.
To—		
Great Britain	\$16,803	
United States	16,909	
Newfoundland	158	
Other countries	20,707	
Total	\$60,577	
*Rubber waste:		
To—		
Great Britain	\$4,628	
United States	16,482	
Total	\$21,110	
All other manufactures, N. O. P.:		
To—		
Great Britain	\$12,571	
United States	176	\$557
Newfoundland	912	
New Zealand	89	
Other countries	1,705	
Totals	\$15,453	\$557
†Gum chicle:		
To—		
Great Britain		\$188
United States	\$236,065	493
Totals	\$236,065	\$681

*During September 165,800 pounds of rubber waste was exported to the United States and 38,600 pounds to Great Britain.

†During September 447,315 pounds of gum chicle was exported to United States and 539 pounds to Great Britain.

UNITED KINGDOM RUBBER STATISTICS.

IMPORTS.

UNMANUFACTURED	October, 1916.	
	Pounds.	Value.
Crude rubber:		
From—		
Dutch East Indies	849,600	\$501,523
French West Africa	37,600	10,796
Gold Coast	1,000,000	49,771
Other countries in Africa	895,800	453,333
Peru	700	357
Brazil	1,799,800	1,199,896
British India	445,500	261,186
Straits Settlements and dependencies, including Labuan	2,713,500	1,622,193
Federated Malay States	3,107,100	1,975,490
Ceylon and dependencies	1,599,000	330,947
Other countries	258,400	152,891
Totals	11,899,000	\$6,558,383
Waste and reclaimed rubber	454,300	\$28,403
Gutta percha	502,400	277,712
MANUFACTURED—		
Apparel, waterproofed		\$1,447
Boots and shoes, dozen pairs	27,470	288,341
Insulated wire		72,228
Automobile tires and tubes		405,633
Motorcycle tires and tubes		2,225
Cycle tires and tubes		81,082
Tires not specified		257

EXPORTS.

MANUFACTURED	October, 1916.	
	Pounds.	Value.
Apparel, waterproofed		
To—		
France		\$80,696
British South Africa		27,437
British East Indies		5,588
Australia		31,211
New Zealand		20,111
Canada		29,517
Other countries		245,626
Totals		\$440,186
Boots and shoes, dozen pairs	14,703	\$105,805
Insulated wire		263,804
Submarine cables		102,283
Automobile tires and tubes		411,210
Motorcycle tires and tubes		57,401
Cycle tires and tubes		164,501
Tires not specified		114,883
Manufactures not specified		657,842

EXPORTS—FOREIGN AND COLONIAL.

UNMANUFACTURED	October, 1916.	
	Pounds.	Value.
Crude rubber:		
To—		
Russia	33,600	\$23,657
France	1,878,100	1,001,142
United States	3,460,200	1,817,844
Other countries	1,375,500	860,637
Totals	6,747,400	\$3,703,280
Waste and reclaimed rubber	34,600	\$6,142
Gutta percha	58,500	24,562
MANUFACTURED—		
Apparel, waterproofed		\$62
Boots and shoes, dozen pairs	2,973	15,227
Insulated wire		3,242
Automobile tires and tubes		434,935
Motorcycle tires and tubes		5,422
Cycle tires and tubes		343
Tires not specified		5,512

RUBBER STATISTICS FOR ITALY.

IMPORTS OF CRUDE AND MANUFACTURED RUBBER.

UNMANUFACTURED	Eight Months Ending August, 1916.	
	Pounds.	Value.
India rubber and gutta percha—raw and reclaimed:		
From—		
Great Britain	2,265,560	
Straits Settlements	1,135,420	
African French Colony	6,380	
Belgian Congo	219,120	
Brazil	3,419,460	
Other countries	940,280	
Totals	7,986,220	\$5,604,874
Rubber scrap	4,928,220	\$389,105

MANUFACTURED—		
India rubber and gutta percha—threads:		
From—		
United States	45,100	
Great Britain	24,420	
Other countries	6,380	
Totals	75,900	\$133,170
India rubber and gutta percha—sheets:		
Cut sheets	2,420	\$3,609
Elastic fabric	220	87
Insulated wire	440	116
Hard rubber	27,720	19,454
India rubber and gutta percha—tubes:		
Cut sheets	1,100	\$1,737
Elastic fabric	9,020	4,748
Other forms	4,180	2,666
Belting	95,480	58,723
Rubber coated fabrics, pieces	93,280	114,565
Boots and shoes,—pairs		
From—		
United States	15,078	
France	10,283	
Other countries	143	
Totals	25,504	\$24,611

Elastic webbing:		
From—		
France	14,520	
Germany	880	
Other countries	19,800	
Totals	35,200	\$46,320
Elastic fabric—not specified:		
From—		
France	215,600	
Great Britain	91,740	
Other countries	7,480	
Totals	314,820	\$248,565

IMPORTS OF CRUDE AND MANUFACTURED RUBBER.

Tires:	Pounds.	Value.
From—		
France	816,860	
Great Britain	340,340	
Other countries	24,860	
Totals	1,182,060	\$2,073,978
Other rubber manufactures:		
From—		
United States	1,169,520	
France	872,300	
Great Britain	589,160	
Other countries	880	
Totals	2,631,860	\$1,847,087
Total Imports		\$10,573,415

EXPORTS OF CRUDE AND MANUFACTURED RUBBER.

UNMANUFACTURED	Eight Months Ending August, 1916.	
	Pounds.	Value.
India rubber and gutta percha—raw and reclaimed:	735,460	\$254,220
MANUFACTURED—		
India rubber and gutta percha—threads:		
To—		
France	6,600	
Great Britain	8,580	
Argentina	3,740	
Other countries	19,580	
Totals	38,500	\$67,550
India rubber and gutta percha—sheets:		
Cut sheets	3,520	\$5,250
Elastic fabric	1,980	782
Insulated wire	660	174
Hard rubber	43,780	30,726
India rubber and gutta percha—tubes:		
Cut sheets	9,460	\$14,938
Elastic fabric	75,020	39,488
Other forms	96,360	44,174
Belting	1,540	946
Elastic webbing:		
To—		
France	6,160	
Greece	75,900	
Egypt	18,700	
Argentina	85,580	
Brazil	77,880	
Cuba	24,860	
Other countries	139,260	
Totals	428,340	\$563,657
Elastic fabric—not specified:		
To—		
Spain	440	
Argentina	22,000	
Brazil	220	
Uruguay	1,760	
Other countries	10,780	
Totals	35,200	\$61,760
Tires:		
To—		
France	156,420	
Great Britain	3,070,540	
Switzerland	66,660	
India and Ceylon	353,540	
Australia	78,540	
Argentina	787,820	
Brazil	453,200	
Other countries	378,180	
Totals	5,344,900	\$9,377,870
Other rubber manufactures:		
To—		
Great Britain	42,460	
Switzerland	44,000	
Argentina	70,620	
Other countries	166,540	
Totals	323,620	\$227,122
Total Exports		\$10,688,657

LONDON AND LIVERPOOL RUBBER STATISTICS.

IMPORTS.

October, 1916.

UNMANUFACTURED -		London.		Liverpool.	
Crude Rubber:		Pounds.	Value.	Pounds.	Value.
From German West Africa				2,700	\$1,385
Java	562,400	\$325,722			
Other Dutch Possessions in Indian Seas	287,200	175,801			
France				70,000	31,573
French West Africa				37,600	10,796
Madagascar	9,000	3,227			
Portugal	2,800	1,985	2,200	571	
Portuguese E. Africa.	22,900	12,447			
Spain			300	181	
Liberia			13,900	3,023	
United States			1,000	424	
Peru			700	357	
Brazil	4,700	3,356	1,795,100	1,196,540	
Uruguay			42,600	24,252	
Bolivia			29,100	17,326	
Egypt	6,700	3,494			
Sierra Leone			100	33	
Gold Coast			122,600	49,771	
Nigeria			67,600	23,762	
Cape of Good Hope.	83,600	60,285			
British East Africa.	300	152			
Nyasaland	10,500	6,902			
British India	445,500	261,186			
Straits Settlements and Dependencies.	2,372,200	1,411,554	341,300	210,649	
Fed. Malay States.	3,107,100	1,975,390			
Ceylon and Dependencies	1,568,500	874,621	35,500	20,430	
British N. Borneo.	108,700	75,322			
New South Wales.	1,300	785			
British West Indies.	1,000	714			
British Guiana.	1,800	1,000			
Seychelles	500	262			
Totals	8,591,700	\$5,204,205	2,562,300	\$1,591,082	

Waste and Reclaimed Rubber:

From United States	64,500	\$14,756	30,000	\$4,817
Portugal	18,800	1,999		
Channel Island	5,800	381		
Egypt	11,400	1,052		
Cape of Good Hope.	15,000	1,390		
British India	13,400	1,271		
New Zealand	38,000	1,604		
British West Indies.	900	48		
Totals	167,800	\$22,501	30,000	\$4,817

EXPORTS.

Waste and reclaimed rubber manufactures of the United Kingdom:

To France	62,900	\$5,307	\$56,800	\$11,695
Spain	35,400	2,718	13,000	2,841
Italy	79,600	3,727		
United States	728,900	36,285	371,100	40,621
Straits Settlements.	1,100	224		
New South Wales.	6,000	1,081		
Canada	57,700	2,475		
Russia			13,500	4,141
Japan			11,300	1,457
Totals	971,600	\$51,817	465,700	\$60,756

RE-EXPORTS.

Crude rubber:

To Sweden	51,300	\$27,565	26,900	\$16,541
Denmark	29,200	16,570		
France	1,488,900	804,192	255,800	162,064
Spain	33,700	20,254	30,600	18,826
Italy	143,300	86,532	161,200	100,864
United States	2,968,400	1,602,469	426,200	175,720
New South Wales.	4,500	1,147	24,800	16,332
Canada	720,200	454,028	19,100	8,854
Russia			33,600	23,657
Norway			8,900	5,141
Japan			5,600	4,108
Victoria			114,000	82,686
Totals	5,439,500	\$3,012,757	1,106,700	\$614,793

Waste and reclaimed rubber:

To France			21,200	\$4,204
Italy			13,400	3,299
Totals			34,600	\$7,503

THE MARKET FOR RUBBER SCRAP.

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NEW YORK.

WHATEVER strength developed in the rubber scrap market early in the month was due, no doubt, to the firm position of crude rubber, which had advanced strongly. This has to a certain extent supported the scrap market, which has been generally firm throughout the month with prices ruling about the same as those quoted a month ago. About the middle of the month rumors of peace resulted in cautious trading that featured the market until the inevitable quiet of the holiday season prevailed. The many railroad embargoes have, moreover, adversely affected trading at this time and caused more or less difficulties in shipping and receiving stocks. There was an easier tendency noticed during the last week of the month and lower values seemed imminent, but the volume of business done was insufficient to affect the level of prices.

BOOTS AND SHOES. There has been some business done at 10 cents delivered, but 10½ cents was the accepted dealers' price for 50-ton lots. It is evident that supplies are not accumulating to such an extent as to be burdensome. Trimmed and untrimmed arctics have moved freely, the former bringing as high as 7½ cents and the latter 6½ to 6¼ cents in a firm market.

AUTO TIRES. Tires have been offered rather freely. Mixed tires were fairly firm, but not very interesting to the mills at 7 cents, although this price may have been shaded in some instances. The special grades of white G. & G. tires were dull and featureless at 8½ cents. Bicycle and solid tires were in good demand at firm prices, ranging from 4¾ to 5 cents for the former and 5½ to 5¾ cents for the latter.

INNER TUBES. The demand has been good at prices slightly in advance of those quoted a month ago. Sales of No. 1 tubes have been made to the mills at 26 to 26½ cents delivered. No. 2 and red tubes have been firm at 11½ cents.

MECHANICALS. Business in all grades has been very quiet and confined to small lots. Hose, however, has received some attention and has been fairly firm in price, the large grade bringing 1½ cents. Air-brake hose had a limited call at 5¾ cents delivered.

London imports of waste and reclaimed rubber for November were 109,300 pounds; Liverpool, 20,100 pounds. Exports from London were 1,244,000 pounds; from Liverpool, 106,800 pounds.

NEW YORK QUOTATIONS FOR CARLOAD LOTS DELIVERED.
DECEMBER 26, 1916.

Prices subject to change without notice.

	Per Pound.
Boots and shoes	\$0.09 ¾ @ .10
Trimmed arctics	.07 ¾ @ .07 ¾
Untrimmed arctics	.06 ¾ @ .06 ¾
White tires, Goodrich and Goodyear	.08 ¼ @ .08 ¼
Auto tires, standard white	.06 ¾ @ .06 ¾
standard mixed	.06 ¾ @ .06 ¾
stripped, unguaranteed	.04 ¾ @ .05
Auto peelings, No. 1	.09 ½ @
No. 2	.08 ¾ @
Inner tubes, No. 1	.25 ¾ @ .26
No. 2	.11 ½ @
red	.11 ½ @
Irony tires	.02 ¾ @
Bicycle tires	.04 ¾ @ .04 ¾
Solid tires	.05 ¼ @ .06
White scrap, No. 1	.13 ¾ @ .14
No. 2	.10 @
Red scrap, No. 1	.10 @ .11
No. 2	.08 @
Mixed black scrap, No. 1	.04 ¾ @
No. 2	.04 @
Rubber car springs	.04 ¾ @
Horse shoe pads	.04 ¾ @
Matting and packings	.01 @
Garden hose	.01 ¾ @ .01 ¾
Air brake hose	.05 ½ @ .05 ½
Cotton fire hose	.02 ¾ @
Large hose	.01 ¾ @
Hard rubber scrap, No. 1, bright fracture	.26 @
Battery jars (black compound)	.02 ½ @
Insulated wire stripping	.03 ¾ @
Rubber heels	.03 ¾ @

THE MARKET FOR COTTON AND OTHER FABRICS.

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NEW YORK.

The market for cotton and other fabrics during the month just past. Liquidation has been very heavy. From 20 cents, the New York spot price on December 1, cotton declined to 16½ cents by the 23d of the month. March contracts sold at 16.22 on December 21, representing a decline of \$25.50 per bale from the high prices recorded late in November. Possibility of the crop forecast being underestimated, general optimism in regards to peace prospects and confidence in future consumption had a restraining influence on the market, which later in the month became stronger. Unsettled conditions still prevail and caution appears to be dominating the present situation.

EGYPTIAN COTTON. Sudden and violent fluctuations have characterized the Alexandria market during December. Sakellarides sold for 47 cents, with the other grades in the list comparatively high. That stocks are being held in anticipation of further advances is generally conceded. Crop estimates are said to be too optimistic in view of the short acreage and dangers that threaten the growing plant.

SEA ISLAND COTTON. The active demand in evidence at Savannah early in the month absorbed all the round lots offered at 52 cents. The market continued quiet until the middle of the month when considerable inquiry developed and prices that had dropped to 50 cents became firmer. Some small business was done prior to the holidays at prices around 50 cents, and the condition of the market was generally quiet. Holders are not disposed to sell their good grades, but appear willing to make concessions on the inferior sorts. Stocks at Savannah and Charleston, December 1, were 8,653 bales, against 14,875 bales a year ago.

MECHANICAL DUCK. The demand for hose and belting duck continues to be good, and contracts are being made covering the last half of next year. Prices softened somewhat with the decline in the raw material, resulting in a loss of ½ cent a pound in belting duck. The outlook is for higher rather than lower prices, due to the uncertainty of sufficient supplies of raw cotton and the large demand for mechanical duck that comes with the usual industrial activity in the spring.

SHEETINGS, OSNABURGS AND DRILLS. There has been a fair demand for these fabrics and with few exceptions prices have remained about the same as a month ago. A brisk demand from Canada was noted during the month, while European business was very quiet. The decline in raw cotton affected only spot goods for immediate delivery and at prices a little under the market.

TIRE FABRICS. The demand has continued to be good for all grades of fabrics used in tire building. The mills are still sold far ahead and contracts have been made covering the requirements of the trade for next year. In fact, prices have advanced about 5 cents the square yard within a month, and there are no basic reasons for a belief in lower prices under the present market conditions.

NEW YORK QUOTATIONS.

DECEMBER 26, 1916.

Prices subject to change without notice.

Aeroplane and Balloon Fabrics:			
Wamsutta, S. A. I. L. No. 1, 40-inch.....	yard	\$0.32½ @	
O/X B. No. 4, 38½-inch.....		.32½ @	
36-inch.....		Nominal	
Wool Stockinettes—52-inch:			
A—14-ounce.....	yard	1.25 @	
B—14-ounce.....		1.50 @	
C—14-ounce.....		1.75 @	
Cotton Stockinettes—52-inch:			
D—14-ounce.....	yard	.50 @	.55
E—11½-ounce.....		.42 @	.50
F—14-ounce.....		.55 @	.60
G—8-ounce.....		.48 @	.50
H—11-ounce.....		.50 @	.55
I—9-ounce.....		.42 @	.45

Colors—white, black, blue, brown.			
100 lb. S. I. L. No. 1, 40-inch.....	R.	.90 @	.92
Tire Fabrics:			
17½-ounce Sea Island, combed.....	square yard	1.25 @	1.35
17½-ounce Egyptian, combed.....		1.10 @	1.15
17½-ounce Egyptian, carded.....		1.05 @	1.10
17½-ounce Pipers, carded.....		.70 @	
Sizing:			
40-inch 2.35 yard.....	yard	.15½ @	
40-inch 2.50 yard.....		.14½ @	
40-inch 2.70 yard.....		.14 @	
40-inch 2.85 yard.....		.13 @	
40-inch 3.15 yard.....		.12½ @	
Osnaburgs:			
40-inch 2.25 yard.....	yard	.16½ @	
40-inch 2.48 yard.....		.15 @	
40-inch 2.42 yard.....		.15½ @	
Mechanical Ducks:			
Hose.....	pound	.38 @	.39
Belting.....		.37 @	.38
Carriage Cloth Duck:			
38-inch 2.00 yard enameling duck.....	yard	.20 @	
38-inch 1.74 yard.....		.22 @	
40-inch 1.66 ounce.....		.43½ @	
42-inch 1.71 ounce.....		.45 @	
Drills:			
38-inch 2.00-yard.....	yard	.16 @	
40-inch 2.47-yard.....		.15½ @	
52-inch 1.90-yard.....		.20 @	
52-inch 1.95-yard.....		.20 @	
60-inch 1.52-yard.....		.26½ @	
Yarns:			
Garden Hose, 12½ cabled.....	pound	Nominal	
Fire Hose 12/1.....		Nominal	
Imported Woolen Fabrics Specially Prepared for Rubberizing—Plain and Fancies:			
63-inch, 3½ to 7½ ounces.....	square yard	.38 @	1.55
36-inch, 2½ to 5 ounces.....		.35 @	.85
Imported Plaid Lining (Union and Cotton):			
63-inch, 2 to 4 ounces.....	square yard	.35 @	.75
36-inch, 2 to 4 ounces.....		.25 @	.50
Domestic Worsted Fabrics:			
36-inch, 4½ to 8 ounces.....	square yard	.32½ @	.57½
Domestic Woven Plain Linings (Cotton):			
36-inch, 3½ to 5 ounces.....	square yard	.15½ @	.20
Raincoat Cloth (Cotton)			
Bombazine.....	yard	.08 @	.08½
Twills.....		.12 @	.18
Tweed.....		.25 @	.35
Tweed, printed.....		.07½ @	.15
Plaid.....		.08½ @	.10
Ropp.....		.24 @	.27
Burlaps:			
32-7½-ounce.....	100 yards	7.20 @	
40-7½-ounce.....		8.50 @	
40-8-ounce.....		8.75 @	
40-10-ounce.....		10.00 @	
40-10½-ounce.....		10.25 @	
45-7½-ounce.....		9.60 @	
45-8-ounce.....		9.75 @	
48-10-ounce.....		12.50 @	

THE MARKET FOR CHEMICALS AND COMPOUND-INGREDIENTS.

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NEW YORK.

THE trade in rubber chemicals and ingredients has been exceedingly active during the month of December. The former conditions that created high ocean rates and insurance and limited cargo space have continued and supplies of raw materials are still difficult to obtain. Domestic producers of both crude and manufactured compounding ingredients are running full capacity to meet the demand. There is no doubt that a great many chemicals formerly imported will be permanently manufactured in this country.

Colors have been rather weak with the exception of Indian red and red oxide, largely due to the small production and the unwillingness of manufacturers to increase their output under prevailing conditions.

ACCELERATORS. Tri-nitro-benzene is not commercially made in this country. Accelerene, a new organic accelerator, is now on the market.

ANILINE OIL. Aniline oil is now sold in a dry powder form and from which the disagreeable fumes have been removed. It is claimed to produce a very tough compound that ages well. Prices have been firm on the standard grades.

ANTIMONY SULPHURET. Considerable interest was shown in the best grades of domestic crimson and golden sulphuret of antimony. American producers appear to be firmly established in the manufacture of this material. Business has been good and

prices unchanged. Contracts have been written covering next year's requirement.

ALUMINUM FLAKE. There has been considerable business done in flake and prices have advanced during the month.

CARBONATE OF MAGNESIA. The export demand has been active, resulting in greatly advanced prices for the standard grades. Domestic producers are well sold ahead.

BARYTES. The demand has been fairly steady with rather quiet conditions prevailing later in the month. Higher prices are expected.

GAS CARBON BLACK. All grades were in demand and prices have advanced in a generally firm market.

LITHARGE. There has been a fair demand for this material which has occupied a firm position during the month due to the strong position of pig lead. Higher prices are predicted.

LITHOPONE. Domestic grades have been in good demand at firm prices that have not changed during the month. Imported grades have been offered at prices subject to previous sale.

OXIDE OF IRON. The bright grades are very scarce and high due to the position of the copper metal.

SHELLAC. This is very high and there is little prospect of relief while uncertain ocean shipments continue.

WHITING. The difficulties attending shipment of the raw material continue. Domestic production of chalk whiting has advanced materially and there are prospects of the situation being considerably relieved thereby.

ZINC OXIDE. Contract prices on French process oxide of zinc have advanced 1½ cents a pound on green, red and white seal since our report of a month ago.

NEW YORK QUOTATIONS.

DECEMBER 27, 1916.

Subject to change without notice.

Accelerene	lb.	Nominal
Acetone (drums)	lb.	\$0.22 @ 0.24
Acid, acetic, 28 per cent. (bbils.)	lb.	.04½ @ .05
cresylic (crude)	gal.	1.00 @
glacial, 99 per cent (carboys)	lb.	.30 @ .40
muriatic, 20 degrees	lb.	.02 @
nitric, 36 degrees	lb.	.05 @
sulphuric, 66 degrees	lb.	.01¾ @ .02
Alumina Pigment, No. 1 Tosio	ton	19.00 @
Aluminum Flake (carloads)	ton	22.00 @
Ammonium carbonate	lb.	.13½ @
Antimony, crimson, sulphuret of (casks)	lb.	.50 @ .60
crimson, "Magmetco"	lb.	Nominal
crimson, "Mephisto" (casks)	lb.	.50 @
golden, sulphuret of (casks)	lb.	.25 @ .35
golden, "Magmetco"	lb.	Nominal
golden, "Mephisto"	lb.	.29 @
golden, sulphuret, States brand, 16-17 per cent. lb.	lb.	.35 @
Asbestine	ton	20.00 @
Asbestos	ton	20.00 @ 40.00
Asphaltum "G" Brilliant	lb.	.03½ @
Barium sulphate, precipitated	lb.	.05½ @
Barytes, pure white	ton	31.00 @
off color	ton	22.50 @
Basofor	ton	112.00 @
Benzol, pure	gal.	.60 @
Beta-Naphthol	lb.	1.00 @
Brown, sienna, raw powdered	lb.	.04 @ .06
umber, raw powdered	lb.	.03 @ .03½
Bone ash	lb.	Nominal
black	lb.	.04 @ .08
Cadmium tri-sulphate (f. o. b. London)	lb.	Nominal
sulphide, yellow	lb.	2.25 @
Cantella gum	lb.	.33 @ .38
Carbon, bisulphide (drums)	lb.	.05 @
black (cases)	lb.	.20 @
tetrachloride (drums)	lb.	.18 @
Caustic soda, 76 per cent.	lb.	.05 @
Chalk, precipitated, extra light	lb.	.04½ @ .05½
precipitated, heavy	lb.	.03¾ @ .05
China clay, domestic	ton	20.00 @
imported	ton	40.00 @ 50.00
Chrome, green	lb.	.15 @ .50
yellow	lb.	.25 @
Cotton linters	lb.	.07½ @
Fossil flour	lb.	.03½ @
Gas black	lb.	.18 @ .25
Gilsonite	ton	40.00 @
Glue, high grade	lb.	.25 @ .33
medium	lb.	.22 @ .23
low grade	lb.	.20 @ .21
Glycerine, C. P. (drums)	lb.	.56 @
Graphite, flake (400 pound bbl.)	lb.	.14 @
powdered (400 pound bbl.)	lb.	.07 @
Green oxide of chromium (casks)	lb.	.75 @
Ground glass (fine)	lb.	.02½ @
Hexamethylene Tetramine	lb.	.65 @
Indian red, reduced grades	lb.	.04½ @ .07½
pure	lb.	.08½ @ .09½
Infusorial earth, powdered	ton	60.00 @
bolted	ton	65.00 @

Iron oxide, red, reduced grades	lb.	.02¾ @ .03¾
red, pure, bright	lb.	.08½ @ .09
Ivory, black	lb.	.16 @ .30
Lampblack	lb.	.12 @
Lead, red oxide of	lb.	.09¾ @
sublimed blue	lb.	.08¾ @
sublimed white	lb.	.08¾ @
white, basic carbonate	lb.	.08¾ @
white, basic sulphate	lb.	Nominal
black hyposulphite (Black Hypo)	lb.	.45 @ .75
Lime, flour	lb.	.01½ @
Litharge	lb.	.09¾ @
English	lb.	.10 @ .11
sublimed	lb.	.09½ @
Lithopone, imported	lb.	Nominal
domestic	lb.	.07 @
Beckton white (carloads)	lb.	Nominal
Magnesia, carbonate	lb.	.12 @
calcined, heavy	lb.	.09½ @
heavy, Thistle Brand	lb.	.12 @
light	lb.	.50 @
Magnesite, calcined, powdered	ton	35.00 @ 39.00
Mica, powdered	lb.	.03¾ @ .05½
Mineral rubber	lb.	.01 @ .02
"M. R. X."	ton	100.00 @
"Genasco" (carloads)	ton	37.00 @
"L. M. R."	ton	57.50 @
"Richmond Brand"	lb.	.03 @
"No. 64 Brand"	ton	35.00 @
"Refined Elaterite"	lb.	.05 @
"Rubrax"	ton	32.50 @
Naphtha, stove gasoline (steel bbls.)	gal.	.22 @
66@68 degrees (steel bbls.)	gal.	.27 @
68@70 degrees (steel bbls.)	gal.	.28 @
V. M. & P. (steel bbls.)	gal.	.21 @
Oil, aniline	lb.	.23 @ .24
corn, refined	cwt.	13.01 @
linseed (bbl.)	gal.	.13 @
palm	gal.	.12 @ .14
paraffin	gal.	.17 @
pine (cases)	gal.	.04 @
rapeseed	gal.	1.90 @ 1.05
rosin, heavy body	gal.	6.75 @
tar (cases)	gal.	.21½ @
soluble aniline colors, yellow, orange, red, violet, blue, green	lb.	5.00 @ 15.00
Orange mineral, domestic	lb.	.12 @
Paragol (carloads)	cwt.	10.54 @
Petrolatum	lb.	.06½ @
Petroleum grease	lb.	.04½ @
Pine solvent	lb.	Nominal
Pine tar	bbl.	8.50 @
Pitch, burgundy	lb.	.04 @ .05
coal tar	bbl.	4.50 @
pine tar	lb.	.12½ @
Plaster of paris	lb.	1.50 @ 1.70
Prussian blue	lb.	1.00 @
Pumice stone, powdered (bbls.)	lb.	.03 @ .04
Resin, Pontianak, refined	lb.	.25 @
granulated	lb.	.20 @
fused	lb.	Nominal
Rosin (280 pound bbls.)	bbl.	6.85 @ 7.80
Rotten stone, powdered	lb.	.02½ @ .04
Rubber black	lb.	.06 @
Rubber substitute, black	lb.	.08½ @ .12
white	lb.	.12½ @ .17
brown	lb.	.12½ @ .17
Rubhide	lb.	Nominal
Shellac, fine orange	lb.	.47 @ .48
Silex (silica)	ton	20.00 @ 36.00
Soapstone, powdered	ton	8.50 @ 13.75
Starch, corn, powdered	lb.	.04 @ .04½
Sulphur chloride (drums)	lb.	.09½ @
Sulphur, flour, velvet, brand (carloads)	cwt.	2.20 @
Bergenport, pure soft brand	cwt.	2.20 @
Talc, American	ton	8.50 @ 13.75
French	ton	24.50 @
Toluol, pure	gal.	2.50 @
Tripolite earth, powdered	ton	60.00 @
bolted	ton	65.00 @
Turpentine, pure gum spirits	gal.	.55 @
wood	gal.	.50 @
Venice	gal.	.11 @ .12
Ultramarine blue	lb.	.11 @ .50
Vermilion, brilliant	lb.	.85 @
Chinese	lb.	.95 @ 1.00
English	lb.	1.50 @ 1.60
Wax, beeswax, white	lb.	1.40 @ 1.60
cote-in, white	lb.	.12 @ .20
carnauba	lb.	.28 @ .48
ozokerite, black	lb.	.60 @ .65
montan, green	lb.	.78 @ .83
ozon	lb.	.12 @ .30
paraffin, refined	lb.	.05½ @ .06
118/120 m. p. (cases)	lb.	.06 @ .06½
123/125 m. p. (cases)	lb.	.06 @ .06½
128/130 m. p. (cases)	lb.	.08½ @ .09
133/136 m. p. (cases)	lb.	.09½ @ .12
crude, white, 117/119 m. p. (bbls.)	lb.	Nominal
yellow, 124/126 m. p. (bbls.)	lb.	.06½ @
Whiting, Alha	cwt.	.75 @ .95
commercial	cwt.	.75 @ .85
gilders	cwt.	.90 @ 1.00
Paris, white, American	cwt.	1.10 @
English, highest	cwt.	1.25 @ 1.50
Wood pulp XXX (carloads)	ton	Nominal
Yellow ochre (Satin)	lb.	.02½ @
India rubber	lb.	1.50 @
Zinc oxide, American process, horsehead brand	lb.	
"special"	f. o. b. factory lb.	.10½ @
"XX red"	f. o. b. factory lb.	.10 @
French process, green seal	f. o. b. factory lb.	.18½ @
red seal	f. o. b. factory lb.	.17½ @
white seal	f. o. b. factory lb.	.18½ @
Zinc substitutes	lb.	25.00 @
Zinc sulphide, pure	lb.	.15 @



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Edited by HENRY C. PEARSON—Offices, No. 25 West 45th Street, NEW YORK.

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Published on the 1st of each month by

THE INDIA RUBBER PUBLISHING CO.

No. 25 West 45th Street, New York.

Telephone—Bryant 2576.

CABLE ADDRESS: IRWORLD, NEW YORK.

HENRY C. PEARSON, Editor

Vol. 55

FEBRUARY 1, 1917

No. 5

SUBSCRIPTIONS: \$3.00 per year, \$1.75 for six months, postpaid, for the United States and dependencies and Mexico. To the Dominion of Canada and all other countries, \$3.50 (or equivalent funds) per year, postpaid.

ADVERTISING: Rates will be made known on application.

REMITTANCES: Should always be made by bank draft or Postoffice or Express money order on New York, payable to THE INDIA RUBBER PUBLISHING COMPANY. Remittances for foreign subscriptions should be sent by International Postal Order, payable as above.

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Entered at the New York postoffice as mail matter of the second class.

TABLE OF CONTENTS ON LAST PAGE OF READING.**THE RUBBER ASSOCIATION OF AMERICA.**

THE change in the name recommended by the board of directors and unanimously adopted at the annual meeting of The Rubber Club of America, Inc., appears to be well conceived as more accurately descriptive of the present aims and activities of the organization, which have become industrial rather than social. Furthermore, it betokens a keener appreciation on the part of the membership as a whole of that larger mission of practical usefulness which constitutes the principal inheritance of the new Association. The proper solution of the several problems of vital import besetting the American rubber industry demands frank exchange of opinion and hearty coöperation for the common good through the medium of an organized body such as The Rubber Association of America promises to become. Thus it seems to have been the height of good judgment to reëlect as officers for the ensuing year those able men who have been so intimately in touch with the developments of the past twelve-month and hence are

exceptionally well equipped to handle the existing situation.

Our problems and opportunities of the present and near future were ably set forth by the distinguished after-dinner speakers at the Rubber Club banquet, as indicated by extracts published elsewhere in this issue. Devoting themselves exclusively to the commercial aspect of these matters, ex-President Taft, Mr. MacRoberts and Colonel Colt convincingly indicated the needs of the American industry, definitely pointed out the pitfalls to be avoided, and offered sound advice for timely action. The other speaker, Bishop DuMoulin, in an address that will be long remembered, discussed America's ethical opportunities, and the enthusiasm with which his wholesome counsel was received emphasized again the gratifying fact that the rubber industry has ever been a leader in this aspect of all commercial relations.

RUBBER TARIFFS OF THE FUTURE.

IN another column will be found a quotation from the "London Times" that shows the feeling that has been aroused by the American invasion of British markets. The fact that English factories were not able to make the goods because they were busy with war orders, nor the fact that the markets were eager for American goods, (these being oftener available) makes not a particle of difference. Nor is the contention of the writer at all unreasonable. In his place any American manufacturer would voice the same complaint and perhaps not as temperately. It is a good guess, therefore, that once the war is over American goods will be handicapped in English markets. A second guess is that an export tariff will be put upon British-grown rubber. Further, as prediction is the motive of this brief, an import tax upon crude rubber will be assessed by our own needy government. Then, there will doubtless follow a downward revision of the tariff on manufactured rubber goods. All of this is in sight, and some, if not all, sure to come.

THE RUBBER INDUSTRY AND CONSERVATION OF NATURAL RESOURCES.

THE report of the special committee of the Chamber of Commerce of the United States regarding combinations to conserve natural resources, and the favorable result of its referendum to the commercial bodies, announced early in January, touch the rubber industry very nearly, for the recommendation of the National Chamber is bound to carry great weight in Congress. As coal, solvent naphtha and the future supply of our present motor-car fuel are involved, the matter is worthy the serious attention of rubber manufacturers.

Most legislation affecting our natural resources, so long exploited, has made no distinction between those which become exhausted or greatly depleted through utilization, and those which to a degree renew them-

selves every year. It is a natural consequence, therefore, that the former now have a tendency toward extinction. Thus to mitigate this as far as possible, the Chamber committee recommends remedial legislation to permit coöperative agreements, under federal supervision, in those industries which involve primary natural resources, on condition that the agreements in fact tend to conserve the resources, to lessen accidents, and to promote the common good. The plan is to enlarge the powers of the Federal Trade Commission beyond its present function of investigation and authorize it to formulate constructive plans for the promotion and safeguarding of public interest under which an industry may operate alike to the benefit of consumers, workmen, and producers. The committee realizes that these are primarily matters of state law and has in mind only such legislation as would bring natural resources under federal statutes and define the conditions under which they may legally become commercial commodities in interstate commerce.

The quantities of products our natural resources are called upon to furnish have greatly increased during the years which have elapsed since our general legislation dealing with interstate trade was enacted. The production of coal from American mines has increased almost fivefold, while the population has increased less than 70 per cent. During the past quarter of a century the yearly drain upon our sources of petroleum has increased sixfold and more. The commercial utilization of natural gas, which fell off in earlier years, has since increased, reaching \$101,000,000 last year, when 628 billion cubic feet were used.

In October the director of the Bureau of Mines said that we have probably reached the climax of our production of crude oil, adding that the Geological Survey estimates that deposits of petroleum as yet undeveloped will scarcely furnish a supply for more than 30 years. If this estimate be correct, our supplies of natural gas may not last so long.

Something like 40 per cent of the coal in the seam has been said by the director of the Bureau of Mines to be lost as far as beneficial utilization is concerned. Millions of barrels of oil have been wasted by being allowed to flow into the streams, by being mixed with water, or by evaporation. There has been no such waste in any other sort of mining. By passing into the air from uncontrolled gas wells, from oil wells, from giant flambeaus, from leaking pipe lines, and from many other methods of waste, natural gas is said to be sacrificed at a rate of not less than one billion cubic feet a day, and probably very much more.

Can any sagacious manufacturer, whether of rubber or other goods, contemplate these facts without realizing the urgent necessity of intelligent coöperation for the common good between the government and producers of American raw materials?

A MONUMENT TO THE INVENTOR OF THE PNEUMATIC TIRE.

THE recent suggestion of F. C. Millhoff that a monument be erected to the man who invented the pneumatic tire is one not to be lightly forgotten. Indeed, it has much to commend it, for while perhaps less spectacular than wireless telegraphy, the aeroplane, the motion picture and similar epoch-making inventions, the pneumatic tire certainly revolutionized transportation and made the automobile possible. But Mr. Millhoff very aptly says:

The man who invented the first pneumatic tire would certainly be entitled to consider himself one of the greatest contributors to human progress, yet not one person in a million even knows his name, and very few ever wondered who he was. If anybody ever badly needed a monument as a protection against oblivion, he is the man.

When that happy time comes that the world finds itself at peace, the motorists, tire and automobile manufacturers of every civilized country might well join in raising a fund for a suitable memorial to Robert William Thomson, the first patentee of a pneumatic tire in England in 1845. The United States, however, is the center of the tire and automobile industry, and if, meantime, Americans decide to honor this worthy pioneer in a great industry, it is easy to foresee that it will be nip and tuck between Akron and Detroit as the site of the memorial.

WITH THE PASSING OF HENRY A. GOULD THE RUBBER trade loses a striking and interesting figure, a "gentleman of the old school." His gentle dignity and precise courtesy were as much a part of his business as of his social life. While he was an able business man, and a pioneer in large undertakings, his leanings were toward the scholarly arts and the betterment of mankind. To his staff he was ever the respected teacher rather than the "boss." A quaint, picturesque personality, we of the trade shall not see his like again.

ALONG WITH THE PREDICTION THAT FINE LEATHER shoes will soon cost \$30 per pair, comes the announcement that "leatherless" shoes are to be worn throughout the West next summer. Leatherless does not mean rubberless, however.

THE INCREASING DEPENDENCE OF THE United States on the tropics for raw materials and foodstuffs not produced in this country is shown by the fact that more than a billion dollars' worth of tropical products were brought into this country during the fiscal year 1916. The exact total, \$1,060,850,416, represented an increase of \$253,208,231 over the year 1915. Imports of rubber, etc., amounted to \$304,000,000 during the fiscal year 1916, against \$280,000,000 in 1915, and \$109,000,000 in 1905, and were exceeded in value only by sugar, coffee and fibers.

The Rubber Club's Seventeenth Annual Banquet.

WHILE the diners may have talked among themselves of recent achievements and present prosperity, our problems and opportunities after the war formed the chief topic of the distinguished after-dinner speakers at the seventeenth annual banquet of The Rubber Club of America, Inc., which was held in the grand ballroom of the Waldorf-Astoria, New York City, on Monday evening, January 8.

Before the banquet was served the diners gathered in an adjoining room and in the congenial atmosphere of an informal reception greeted their friends and renewed acquaintances.

Upon entering the banquet hall one was immediately impressed by a welcome departure in the decorations. Large American flags predominated and were introduced in the simple and pleasing form of sharp-angled trophy stacks at suitable lo-

Each guest found at his place an attractive program and menu with a cover in lavender, green and gold embodying an attractive design including the Rubber Club seal, a sprig of *Hevea* leaves, the western hemisphere, and a man tapping a rubber tree.

After an invocation by The Right Reverend Frank DuMoulin, Bishop-Coadjutor of the Diocese of Ohio, the diners enjoyed an excellent repast and during the addresses that followed manifested great enthusiasm as the salient points of each speaker were brought forth.

A TOAST TO THE LADIES.

At the conclusion of the dinner President Firestone called attention to the fact that for the first time in its history the Rubber Club enjoyed the honor and pleasure of having ladies present to hear the after-dinner speaking. In proposing a toast to "The Ladies," which was heartily drunk, he expressed the belief that the distinguished guests of honor must realize "that the gentlemen composing the great rubber industry have a distinct appreciation of the refined and the beautiful."

PRESIDENT FIRESTONE'S ADDRESS.

President Firestone then continued with the following address, announcing the birth of The Rubber Association of America and touching briefly upon the Rubber Club's activities of the past year and its growth in membership:

As President of the Rubber Club I am very much interested—and I want every member to feel interested—in both its fraternal and business activities. However, as there are many of our members here tonight who have not attended the annual meeting nor taken an active part in it, I know that you will be much interested in the business activities of the Club. I want to say just a word in regard to the rubber industry and the Rubber Club of America, from now on to be known as The Rubber Association of America.

The reason that your directors have recommended this change in name to the members at the annual meeting was that it better represents the true position of the organization. Originally, the New England rubber men gathered together for social purposes only. Out of these meetings grew the Rubber Club of America, the purpose of which was not only to bring the rubber interests together socially, but to promote the welfare of the rubber industry.

This so changed the nature of the organization that the name Rubber Club became misleading, and as a result we have adopted the title, The Rubber Association of America, which more clearly describes this body.

As our raw materials are received from foreign lands, and many of our products are shipped to foreign countries, there is every reason why the rubber interests must have a strong and efficient organization to look after the interests not only of the rubber industry but the entire commercial activities of the United States, which are so vitally affected by our well-being.

Rubber is the most important commodity in the world. It is not only of great importance commercially, but our happiness and social welfare are to a large degree dependent upon it. You will be surprised to know that the rubber manufacturing industry stands among the first few leaders in volume in dollars and cents.

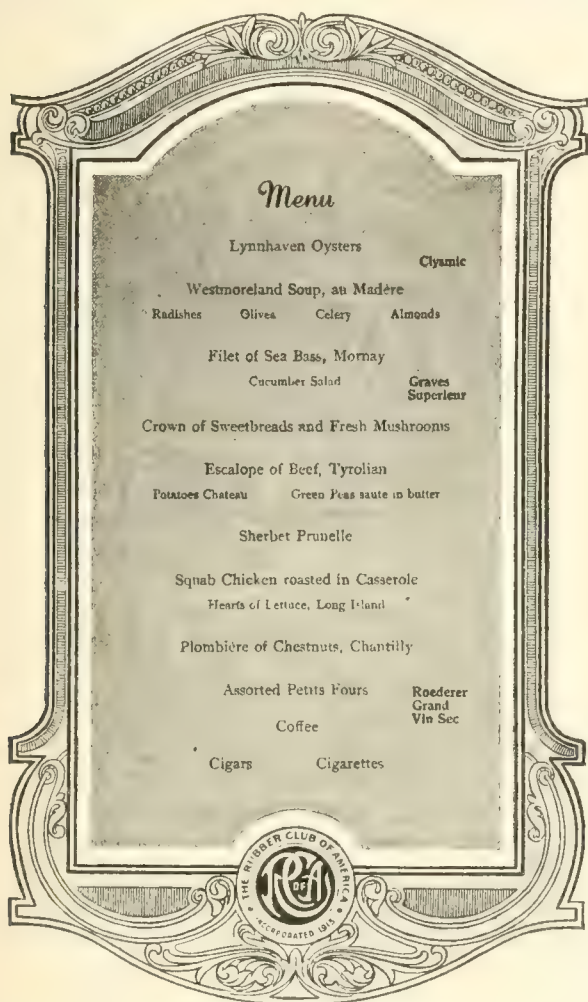
During the past year your Advisory Committee has been very active and held fortnightly meetings effectively dealing with the questions which have been brought before it. The members of this committee have given generously of their time for attendance at these meetings.

A committee on legislation has been closely in touch with measures affecting the industry which have been introduced at Washington. This committee, however, has had comparatively little to do, as no tariff changes have been attempted.

One of the most important efforts of the year was the formation of rules and a uniform contract to govern transactions in crude rubber between importers and dealers and manufacturers.

The committee has submitted a report which was sent to every member and has now been adopted.

An Arbitration Committee to assist in carrying out the rules has been provided for.



cations about the room, producing a tall, narrow effect in harmony with the architectural lines. At the head of the room hung the Rubber Club banner, while the spaces between the trophy stacks and also along the fronts of the two tiers of boxes, occupied by the ladies during the after-dinner speaking, were draped with large flags in a frieze-like effect interspersed with blue banners displaying in true colors the coat of arms of the several states in which the rubber industry flourishes. But the crowning feature consisted of a great American flag, cleverly concealed, which suddenly unfurled to the inspiring strains of the "Star Spangled Banner," and immediately created a happy spirit of patriotic enthusiasm.



SEVENTEENTH ANNUAL BANQUET OF THE RUBBER CLUB OF AMERICA, INC., AT THE WALDORF-ASTORIA, JANUARY 8, 1917.

A Bureau of Statistics was established last May which, it is hoped, will soon be able to distribute accurate information covering the importing of crude rubber and give the members a valuable report concerning the industry in general.

The following divisions are now affiliated with The Rubber Association of America: The Mechanical Rubber Goods Division, The Rubber Sundries Division, The Hard Rubber Manufacturers, The Rubber and Fiber Sole Manufacturers, The Rubber Heel Club of America, The Rubber Reclaimers' Club and The American Rubber Manufacturers' Association of London.

It is hoped that our group organization will be greatly extended in the future and that much benefit will be derived from the closer association of these groups and the open competition bureaus which may be established.

The Committee on National Preparedness has completed its work and will be succeeded by a research committee.

The organization has shown a very satisfactory growth during the past year. On January 1, 1916, we had enrolled 191 firm members and 227 associate members. On January 1, 1917, we had enrolled 231 firm members, an increase of 40, and 235 associate members, an increase of 8—making a total membership of 465. There are still, however, a number of organizations directly interested in the manufacture of rubber goods which are not represented, and it is hoped that there will be an increase in the membership prior to the next annual meeting.

EX-PRESIDENT TAFT ADVOCATES PROTECTION OF OUR INTERESTS ABROAD AND RUBBER GROWING IN AMERICA.

Ex-President Taft, the principal speaker of the evening, manifested a keen insight of the status and needs of the rubber industry gained through four years' residence in the Philippines, where he established a government and made it possible for American capital to grow rubber under the American flag. After reviewing the growth and importance of the rubber industry and referring to the United States as the world's principal rubber consumer, he pointed to the present situation of Germany and the Central Powers as proving that rubber is a military necessity and demonstrating the awkwardness of being without an adequate supply in time of war. Mr. Taft then reviewed the principal sources of crude rubber, touched briefly upon American enterprise in the ownership and maintenance of rubber plantations in the Dutch East Indies and elsewhere, and emphasized the possibilities of the tropical and semi-tropical areas within our national jurisdiction. Our agricultural authorities, he said, should be awake in their researches to investigate the feasibility of raising rubber in Texas and in those regions of the United States which resemble Mexico in climate and physical conditions. Mention of the guayule industry and its interruption by the deplorable conditions of anarchy now existing in Mexico brought him to a consideration of our foreign policy with respect to the protection of Americans carrying on industries abroad, and to quote Chief Justice Marshall of the Supreme Court and Mr. Justice Miller as to the manifest constitutional rights of American citizens, both individually and in bodies constituting corporations. Continuing he said in part:

Of course some injustice done to our people in other countries may not be of sufficient importance to justify our going to war. It must always be a matter of degree in resorting to such extreme measures. But it will be a fatal injury to our American enterprise and to the great usefulness of foreign investments by our citizens if it is to be understood that we will never resort to extreme measures in discharging the constitutional duty of this country towards its citizens when in foreign lands, and in protecting them against the unlawful invasion of lawless foreign government. And you gentlemen, interested as many of you are, in the industry of producing crude rubber in various foreign countries, in some of which the governments are not the most able, are certainly greatly interested in the maintenance of the constitutional protection of our citizens abroad.

But we have tropical countries of our own in which rubber can be raised. Rubber is produced in some quantity in the Philippines. I was greatly interested in the subject when I was connected with the Government of Rhode Island, but unfortunately the policy of Congress, which we as a commission protested against, has very seriously interfered with the development of the industry there. Oppressed as Congress was by the popular fear of the power and monopoly of great corporations in this country, it allowed itself to be frightened into a policy in the Philippines that has worked greatly to the detriment of their

people, to the detriment of this country, and increasing the trade of those islands. The limitation contained in the fundamental act of the Philippines forbidding the acquisition of land by foreign corporations of more than 2,500 acres is an absurdity in a tropical country where sugar, rubber and other tropical products should be encouraged. The risks connected with tropical enterprises of that kind are very great. Everyone who is familiar with their working will appreciate the maxim that in five years of operation you have two bad years, one moderate year, and two good years, and that the destruction of bad years in the tropics is in proportion to the greater violence of natural forces in the tropics than in the temperate zone. The amount of land which ought to be cultivated in the Philippines as compared with the amount that is cultivated is so great that the acquisition of parts of it by great corporations could work no evil at all. It is a mere hobgoblin created by dangers of this country which find no counterpart in a retarded country like the Philippines. We did for 12 or 15 years make great progress in the Philippines in many ways, but we might have made a great deal more progress in helping the people to better industrial conditions had we had the assistance of the capital which was available in the United States, and which adverse legislation kept out of those islands. I am very proud of the work which we did for 15 years in giving them a good



W.M. H. TAFT.

government and in bringing about a condition of prosperity there; in giving half of their school population an opportunity for an education; in giving them law and order; in giving them good roads; in giving them a good currency; in giving them a good administration of justice; in giving them good health. But all these things were made possible by the building up by a great civil service guided and strengthened by a body of Americans the like of which I think we have never had in our government before. The present policy in the Philippines has been to drive out of the service of the Philippine Government, all those American civil servants; and we have turned the Islands over to Filipino politicians and to a control that, after the impulse of a good government which they have had shall be exhausted, will result in efficiency and corruption and produce a discontent that will ultimately plague us, responsible as we are for the welfare of the Philippine people. It will create a political situation in which bribery and blackmail will become a feature in every great business projected there. It will make investments of capital less likely and will help neither the people of the Islands nor the business of the country. These are the reasons why the rubber industry has not flourished in the Philippines. I wish it could have been otherwise.

I felicitate the Rubber Club of America on the enterprise that Americans have shown in hunting opportunities for the growth of rubber, and in the increase in the rubber industry. I sincerely hope that it may not be injured by any ill-conceived system of taxation upon crude rubber, which will put our manufacture at a disadvantage with the manufacturers of the world in competition in the sale of rubber goods. I sincerely hope that the utterly illogical process of reducing the duty on manufactured goods and increasing the duty on the raw material entering into them will not be further pursued in our economic policies. The theory that rubber is a luxury is of course not true. When it was proposed to tax automobiles on the theory that they were luxuries, investigation satisfied the proposers that they had grown to be necessities, and with them, of course, the rubber tires that are essential to their use. I hope the lesson which was then learned will be remembered, and that the enormous industry which you represent will be made to pay its taxes in proportion to your profits and your wealth, but not in such an injurious way as to hamper your competition and productive powers to be used not only for your own reasonable and legitimate profit, but for the benefit of the people of the United States.

SAMUEL MACROBERTS ON OUR FUTURE PROBLEMS.

Samuel MacRoberts, vice-president of the National City Bank of New York in charge of all its foreign interests, spoke in the absence of Frank A. Vanderlip because of illness and was introduced by President Firestone as a man to whom the rubber industry is indebted for the establishment of the gold dollar of

the Far East. Mr. MacRoberts pointed out that the problems of the rubber industry are very much the problems of the entire industrial life of the nation. As a result of two years of exceptional plant expansion and prosperity, the outstanding fact of our economical relation to the world is the sudden accumulation by this country of a large additional capital. What this means to our own country and to other nations has not yet crystallized into any definite thought, although various judgments are being hazarded; and whether we agree with any one of them, Mr. MacRoberts believes it plain that the question is not only pregnant with business disaster, but that it has the lure of very great opportunities. Developing this line of thought he sounded a wholesome warning, extracts from which follow:

The fact that the cost of production in this country has steadily risen to unparalleled heights, the unparalleled level of wages, and the resultant high cost of living, all indicates the difficulties that might come to us through this unusual condition. It indicates how easily this situation might be reversed, and this newly acquired wealth drawn away at the close of the war, leaving only the dregs of a discontent and innumerable difficulties of a political and economic nature. Our industry has already expanded, possibly expanded to the limit of our labor market to operate, and if we are to continue to accumulate gold, this labor situation will prevent our investing it in legitimate industrial enterprises. A further accumulation will only result in an expansion of bank credit which we cannot use in our domestic situation.

This is a situation that is recognized by the Scandinavian countries, and is the reason why they have so strenuously discouraged the further importation of gold into their countries. Even if we are ambitious only to hold this gold, we cannot do it unless we can incorporate it promptly into the commercial business of the world.

The optimistic conclusion that New York is to be the financial center of the world, and that the keys of the commerce of the world are already in our hands is clearly untenable, and it is a dangerous tendency for us to drop into the theory that we have become in the natural order of things a great trading nation, and that our economic position is protected and secured for the future. In real fact we bring to the situation of being a great trading nation only one element, that is, this newly acquired wealth—money. Our geographical position is distinctly against it. We are outside of the lines of trade and commerce. We have no shipping facilities. We even seem to ignore the ordinary economic principles that are necessary to found them. We have not a sufficient number of international banks or other machinery for financing a foreign trade. We prohibit the establishment of foreign banks here, which is just as necessary for maintaining a great international trading position as it is for us to establish our branches in foreign lands.

We have few men with any knowledge of foreign trade or international commerce. Our laws have been drafted with a sole eye for a domestic situation and with no regard either for our opportunities or for our necessities abroad. As a nation we have a provincial point of view on all these matters, and until we can develop a settled public opinion which, after all, controls our government, we will have a weak and unstable government to look to for protection.

Now, getting back to the rubber industry, your situation is just the same. You have the same elements in your situation as is in the general industrial life of the country. Where are you going to be to meet your competition when competition is restored, for after all, this great period of prosperity comes directly or indirectly from these abnormal conditions. In international finance the maxim is that the trade follows the loan. Now, with you it is not a question of whether or not you are to make loans, but whether you will make investments in foreign countries to protect your raw materials, to make your supply of raw materials sure, and at a price which is not unequal to that of your competitors abroad. You have exactly the same

problems that the whole country has, and it is to be hoped that the Rubber Association in looking after its own interests will not overlook these problems that apply to the entire country.

COLONEL COLT REVIEWS RUBBER HISTORY.

Introduced by President Firestone as the dean of the rubber industry, a manufacturer who had made American influence felt in foreign countries, and the pioneer whose courage and foresight had brought us nearer the source of supply by leading the way safely and wisely for American capital in the production of plantation rubber, Colonel Samuel P. Colt reviewed the highlights of rubber history in his own genial manner interspersed with much wholesome humor.



COLONEL S. P. COLT.

Placing rubber as the second of the three greatest forces of civilization to-day, the first and third being steel and cement, he reviewed its source, the origin of its name, early experiments in its use, the discovery of vulcanization and the manifold applications made possible thereby. In illustration of the mighty consequences of Goodyear's epoch-making achievement, Mr. Colt pointed to the pneumatic tire which has revolutionized the world. And said he:

I believe if the automobile had been perfected, and the rubber pneumatic tire had been perfected, and the solid tire on the auto truck had been perfected twenty years before any railroad had been built, there would not have been one-half, nor one-quarter, nor perhaps one-tenth of the railroads that there are to-day. But what would we have had in its stead? We would have had the most magnificent roads; we would have gone back to the days of the stage coach magnified, and we would have had the most magnificent roads throughout this country that the world ever knew, surpassing even those of Rome. But the railroad was first, and the railroads are built, and it is going to take time to build the roads, but I say now that the automobile and the automobile truck are going to encroach daily upon the railroads, and for short hauls are going to very largely supersede them, and our roads are going to improve, and you are interested in this great object, Mr. President, of the Lincoln Highway from the Atlantic to the Pacific Coast. I do not believe we can over-estimate to-day the part that rubber is to play in the civilization of the world in the future, and I do not believe that there will be any substitute for the rubber pneumatic tire. I do not know why the Almighty should have given such a product as rubber to the world, but He did, and they have tried to imitate it, they have tried for synthetic rubber, they have tried all things, but there is nothing found to take its place.

Mr. Colt then referred to the high rubber prices prevailing within four years and to the fact that the vision of those who experimented in transplanting the *Hevea* from the banks of the Amazon to the propitious soil and climate of the Far East had developed an inexhaustible supply that is already providing three-fourths of our need at a moderate price. In closing he emphasized the great present need of cooperation in the industry, quoting former Chairman Hurley of the Federal Trade Commission to the effect that cooperation as opposed to ignorant competition is the watchword of the era we are entering—cooperation between employer and employe, among business men, and between business and government.

Mr. Firestone then said:

It is a little late, gentlemen, but you may be interested—with no reflection on the rubber industry, you should be interested in what the next speaker may say to you. In Ohio we not only build factories and prepare presidents for the White House, but we look after the finer sensibilities for this country, while we are here, and for the next world we don't want to take any chances. We are not selfish with that influence—we have



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S. MACROBERTS.

brought a Bishop from Ohio. He is a man who is responsible for my well-being in the paths that I walk, and some other rubber men that I know. Whether he has fulfilled that responsibility it is up to you gentlemen to judge. Before bringing him down here, we didn't take any chances—I spent my vacation with him, and he lives second door to a rubber president, and we concluded that we would like to have him spread the influence among our friends. I am sure you will be interested in hearing from my friend and bishop, Frank DuMoulin.

BISHOP DU MOULIN ON AMERICA'S ETHICAL OPPORTUNITIES.

Genial Bishop DuMoulin, whose beneficent influence has found such generous expression in the welfare work of the rubber factories of Ohio, spoke with earnestness and enthusiasm in appreciation of the importance of the finer sensibilities in business and social relations. Four types of men represent about all there is of life to-day, according to Bishop DuMoulin, the commercial man; the teacher, the ethical man—ever growing more important in this humanitarian age—and the prophet. The viewpoints, achievements and shortcomings of each in their relations one to another he pictured convincingly, and then in the rôle of both prophet and ethical man he pictured brilliantly the wonderful opportunities for progress in every line of human endeavor. Said he in conclusion:



BISHOP DU MOULIN.

It is a mark of the age that a minister, a weak-kneed, effeminate, anaemic minister, if you please, should be allowed to sit at this board with ex-presidents and kings of finance as they discuss the merits of the greatest factor and element in all the world's history, and that he should be allowed to make his contribution to a symposium of the character in which we have all joined tonight. It is because men consciously or unconsciously are getting down to the roots of things, are getting down to the fundamental bases upon which the whole of life is structured and upbuilt and developed. * * * You and I are living in an age which will be looked upon, when the history of life is written, as being the greatest transitional age the world has ever seen. There is not the element of finality about this age; there is not a single atom of completeness about it; it is a contradictory age; it is an introductory age; it is an age of expediency; the human race is forward bound, its hope is in the future, its golden age has yet to come; it is in the vanguard of things; it is looking forward as it never looked forward before, save in one period of three years, in all its far-reaching history. Why, the world has reached that adolescent period in its history, in its development, which constitute it the mightiest opportunity for the men who live in it that has ever been given to any generation of the sons of man. Because we have reached the heir of the ages, we have reached that time that we may well call the nick of time, the strategic era, the pivotal point in the world's history, when every act of morality and truth and self-sacrifice and goodness to-day will be worth a hundred later on, just as it is worth a hundred of anything that has gone. You and I have the privilege of living in the mightiest epoch of human affairs that history has ever recorded or men have ever known; that accounts for its confusions, its upheavals, its cataclysmic and almost unbelievable desires, because the whole world is in influx, is in process, is forward-bound, is in its birth pangs of suffering and blood; and there is a brighter day upon us. As we stand on this threshold age, the eastern sky is streaked with the crimson of the morning sun of a new day, created by the blood-red banners that spell progress and happiness and achievement for our humanity, and may a beneficent Creator who has given us the privilege of living at this epoch in human affairs, give us such sense of responsibility in our commerce, and our education and our ethics, that we may be fitted to the age in which we live, that we may to the full realize the maximum of progress, that we may gain the largest dividend of human welfare and achievement, until the knowledge of truth, of God, and all that is best in life, shall cover this wide world as the very waters cover the sea.

THE MEMBERS AND GUESTS PRESENT.

AT THE PRESIDENT'S TABLE.

Appleton, Francis H.	Hodgman, George B.
Bourn, Hon. A. O.	MacRoberts, Samuel
Clifton, Col. Chas.	Malone, Dudley Field
Cole, W. T.	Perez, Ernesto C.
Colt, Hon. Le Baron B.	Pinheiro, H. C. de Martins
Colt, Col. Samuel P.	Taft, Hon. William Howard
Du Moulin, Rt. Rev. Frank	Voorhees, John J.
Firestone, Harvey S.	

ALPHABETICAL LIST.

A	B	C
Abbott, J. M.	Babcock, F. Huntington	Burnett, Aaron
Achelis, F. G.	Babcox, E. S.	Burr, A. E.
Adams, H. J.	Badenhop, Robert	Burrage, H. L.
Aldrich, Edward B.	Bailey, S. R.	Burrill, W. S.
Altschuler, A. A.	Baird, Collier W.	Butler, O.
Andersen, E. A.	Baird, H. W.	Byles, L. M.
Anderson, J. D.	Baird, Robert L.	Byrne, F. L.
Andrews, Don E.	Baird, William T.	
Appleton, Edwin J.	Baldwin, S. D.	
Appleton, Lloyd E.	Ballou, Roland H.	
Armitage, J. D.	Ballou, Walter S.	
Armstrong, H. G.	Barker, Wm. E.	
Arnold, W. H.	Barnard, Harold H.	
Arthur, Geo. D.	Barnard, O. A.	
Ashcroft, R. W.	Barnes, C. W.	
Austin, F. G.	Barton, B. W.	
Ayer, P. P.	Bass, W. F.	
	Bass, W. H.	
	Bassett, T. W.	
	Basten, Otto	
	Bates, Charles Austin	
	Beal, H. L.	
	Bedell, Harold H.	
	Behrens, Henry	
	Belcher, Edwin W.	
	Bers, Aaron	
	Bers, Edward	
	Berrien, W. P.	
	Besaw, Charles A.	
	Birkenstein, Louis	
	Bishop, Erle A.	
	Blackwell, Wilson H.	
	Blanchard, F. C.	
	Blanchard, J. C., Jr.	
	Blandin, Victor C.	
	Blatt, H. D.	
	Bourn, Lyman M.	
	Brandes, C. O.	
	Brewster, L. O.	
	Brinckerhoff, E. A.	
	Broadwell, E. H.	
	Brodhead, Garrett, Jr.	
	Broughton, J. S.	
	Brown, Andrew H.	
	Brown, A. H.	
	Brown, J. Stuart	
	Bruyn, W. E.	
	Buckleton, E. E.	
	Budlong, M. J.	
	Burley, H. B.	
		D
		Daggett, H. A.
		Daniel, C. A.
		Dannerth, Frederic

Davis, Edgar B.
 Davol, Chas. J.
 DeLanie, H. J.
 De le Graze, Capt.
 DeLisser, Horace
 DeLong, William A.
 Desmond, T. A.
 Devine, Jas. W.
 Dewing, Eben F.
 Dickerson, Geo. B.
 Dickerson, W. H.
 Dodd, Samuel H.
 Donaldson, Wm.
 Dorr, Roy L.
 Doucette, W. M.
 Dowse, Byron C.
 Drake, R. E.
 Drayton, Judson
 Drisler, W. Arthur
 Dryden, Geo. B.
 Duffy, L. A.
 Dugan, Walter J.
 Dumont, L. W.
 Dunbar, E. W.
 Dunbar, F. L.
 Dunbar, F. W.
 Dunbar, J. Frank
 Dunbar, J. Frank, Jr.
 Dunn, H. T.
 Dunn, W. H.
 Dunsford, S.
 DuPuy, H. W.
 Duryea, A. R.

E

Eagles, R. P. M.
 Earle, W. P.
 Elbogen, Paul

F

Fairbank, L. G.
 Farson, John
 Fay, E. E.
 Feinburg, David
 Fera, Henry, Jr.
 Ferguson, Irving B.
 Field, H. E.
 Firestone, Harvey S., Jr.
 Firestone, R. J.
 Fisher, Myron L.
 Fisher, R. L.
 Fisk, H. G.
 Flach, G.
 Flint, Dr. A. W.
 Fogel, T. C.
 Foote, R. F.
 Fox, Frank F.
 Francis, Arnold W.
 French, H. W.
 Freshman, Chas.
 Frissell, F. H.
 Fulkert, Charles
 Fuller, H. P.
 Fulper, E. B.

G

Galt, W. H.
 Gardner, George A.
 Gardner, Thos. M.
 Garretson, C. D.
 Garthwaite, A. A.
 Geddes, Mr.
 Gehring, C.
 Georger, F. P.
 Gerhold, C. H.
 Gibbs, B. S.
 Giles, Jas. F.
 Glaenzer, G. B.
 Glidden, Alfred A.
 Glynn, F. V.
 Goodwin, Leonard
 Gould, M. P.
 Gove, F. G.

Green, H. M.
 Greene, Bartlett
 Greene, N. Lincoln
 Greene, W. E.
 Greenough, A. B.
 Grennor, John, Jr.
 Grieb, William G.
 Grosscup, P. S.
 Growtage, W. B.
 Gunlock, Wm. M.
 Gunn, J. Newton
 Gustin, A. D.

H

Haaker, E. A.
 Hagemeyer, A. H.
 Haines, Wm. M.
 Haldane, D. D.
 Hall, Geo. E.
 Hamilton, R. S.
 Hammar, John
 Hammesfahr, W.
 Handy, J. L.
 Harding, F. H.
 Hardy, A. S.
 Hardy, R. S.
 Harlow, Robert C.
 Harriman, Joseph W.
 Harris, A. C. Spencer
 Harris, Roy G.
 Harrison, Clark W.
 Harrison, O. M.
 Hastings, A. Abbott
 Hatch, T. E.
 Hathorne, E. J.
 Haws, H. E.
 Hayes, Alfred
 Haynes, C. R.
 Heitzmann, C.
 Henderson, B. W.
 Henderson, F. B.
 Henderson, Francis R.
 Henry, D. E.
 Hering, Henry F.
 Herron, John
 Hewins, E. D.
 Hillen, Paul
 Himebaugh, L. C.
 Hodges, Geo. W.
 Hodgman, S. T.
 Hoffstaedter, Hugo
 Holcomb, C. H.
 Holcomb, F. E.
 Holcombe, H. W.
 Holmes, C. H.
 Hood, Frederic C.
 Hopkinson, E. B.
 Hopkinson, Ernest
 Hopper, Chas. C.
 Horn, F. H.
 Hotchkiss, H. Stuart
 Houk, H. G.
 Hubbard, H. B.
 Huber, Edward E.
 Hughson, Wm. F.
 Hutton, Wallace C.
 Huxley, E. H.
 Hyles, Thomas

J

Jacoby, Ernest
 Jamieson, R. E.
 Jenckes, F. L.
 Jenkins, H. W.
 Jenks, Walter H.
 Johnson, Allen F.
 Johnson, Stuart H.
 Johnston, W. A.
 Johnstone, James T.
 Jones, A. B.
 Jones, Frederick H.
 Jones, W. O.

K

Kaufmann, C. B.
 Kaufman, M. B.
 Kavenagh, W. E.
 Kearns, John
 Keeler, L. V.
 Kelly, J. H.
 Kelly, W. J.
 Kelly, Dr. W. J.
 Kendall, J. A.
 Kennedy, David G.
 Kent, W. J.
 Kenyon, C., Jr.
 Kenyon, George
 Kenyon, H. L.
 Kies, W. S.
 Kimball, Thomas F.
 Kittle, F. L.
 Klingsmith, F. A.
 Kniffen, C. E.
 Knoke, E. J.
 Koffman, J.
 Kubie, David S.
 Kubie, Samuel
 Kugler, H. W.
 Kurvy, J. A.
 Kush, Gustave

L

Lahey, F. T.
 Lambert, J. A.
 Lamont, Sloan, Jr.
 La Motte, F., Jr.
 Laurie, Mr.
 Learned, J. H.
 LePau, Louis N.
 Lewis, S. L.
 Lewis, T. S.
 L'Hommedieu, P. B.
 L'Hommedieu, S. Y.
 Linton, Ben B.
 Litchfield, P. W.
 Little, C. E.
 Littlejohn, Lomax
 Littlejohn, R. M.
 Lloyd, Prof. F. E.
 Loeb, Milton
 Loewenthal, R. M.
 Long, Albert
 Long, J. W.
 Louis, J.
 Low, C. H.
 Low, R. A.
 Lowe, George H.
 Lowman, J. S.
 Ludington, G. A.
 Lynah, Jas.
 Lynch, Chas.

Mc

McCallum, Fred
 McClaren, H. L.
 McConnell, R. M.
 McGuire, Thos.
 McKay, C. B.
 McKay, E. B.
 McKenna, Drew
 McKenna, F. R.
 McLean, Joseph F.
 McMaster, H. B.

M

MacKusick, H. A.
 MacMillan, John A.
 MacNamara, L. P.
 Macomb, J. W.
 Maltus, Wm. A.
 Manchester, A. A., Jr.
 Many, Robert
 Marcus, Mr.
 Marland, W. H.
 Marland, Wm. H.

Marsh, Howard L.
 Marshall, T. C.
 Martin, Bertram T.
 Martin, George W.
 Marvin, C. M.
 Mathewson, C. E.
 Maurer, E. J.
 Maus, John B.
 May, Dr. Calvin S.
 Mayer, Levy
 Mayo, Geo. H.
 Means, W. A.
 Measure, Charles
 Meyer, Adolph
 Meyer, Chas. A.
 Meyer, Otto
 Meyers, A. C.
 Meyers, Sidney S.
 Miles, Colonel D. E.
 Miller, C. E.
 Miller, H. C.
 Miller, I. L.
 Miller, J. A.
 Miller, J. Ernest
 Miller, T. W.
 Miller, Wm. B.
 Milne, Gordon
 Miner, Wm. H.
 Mitchel, J. K.
 Montgomery, Henry
 Montgomery, James M.
 Morehead, H. J.
 Morgan, Col.
 Morgan, John
 Morpeth, Wm. R.
 Morris, M. E.
 Morse, Wm. M.
 Muehlstein, Herman
 Muehlstein, Julius
 Murray, James A.
 Murray, James A., Jr.
 Myers, F. E.
 Myers, P. A.

N

Naylor, R. B.
 Norris, Samuel
 Norton, E. F.
 Newcombe, Richard N.
 Nichols, T. B.

O

Oakley, C. H.
 Odell, James E.
 Odell, L. G.
 Okane, J.
 Oliver, N. E.
 Osterloh, A. F.
 Owens, R. J.
 Ochschoen, I.
 Obalski, Xavier W.

P

Page, John E.
 Page, Wallace G.
 Parker, F. L.
 Parker, J. R.
 Parker, Russell
 Partridge, A. G.
 Pearce, H. E.
 Peaty, F. H.
 Pell, George E.
 Perlsh, Henry
 Pfaff, Ed. F.
 Pfeifer, William
 Pharis, Carl
 Pingree, M. H.
 Pitcher, C. N.
 Pitcher, W. L.
 Place, Charles A.
 Plumb, L. J.
 Poel, Frank

Poole, William
Pratt, B. H.
Presbrey, Frank
Price, Percy B.
Price, R. B.
Proctor, Lawrence B.
Proctor, W. L.
Pusinelli, Fred

R

Raymond, H. E.
Rector, J. M.
Reddy, H. H.
Reed, Henry D.
Reed, W. Boardman
Reeve, Arthur
Reeves, George H.
Reynolds, F. I.
Replogle, H. H.
Rice, R. L.
Richards, T. G.
Rieder, F. H.
Rigdon, Walter D.
Robertson, J. G.
Roberts, Malcomb
Robinson, H. H.
Robinson, J. Thomas
Robinson, Thomas L.
Rockhill, L. C.
Rose, J. T.
Rosenblatt, Sam
Rousmaniere, J. E.
Royal, Joseph S.
Rutherford, W. O.
Ryckman, W. G.

S

Sachs, R. P.
Sawyer, A. M.
Sawyer, H. E.
Schaffer, F. F.
Scheren, G. Arthur
Schlosser, George
Schwab, F. N.
Schweinert, M. C.
Seiberling, F. A.
Semple, C. H.
Seward, A. M.
Shilts, W. D.
Shreve, J. Nelson
Simonson, W. A.
Simpson, R. W.
Sipp, John L.
Sisler, L. E.
Sloane, Charles
Slocum, Edward M.
Smith, F. Haskell
Smith, H. E.
Smith, Herbert E.
Smith, H. W.
Smith, Theodore E.
Smith, William B.
Smith, W. Richmond
Sorricks, C. S.
Spadone, Amedee
Spadone, Henry
Speaks, C. E.
Spoonier, Herbert T.
Stearns, E. W.
Stedman, A. W.
Stephens, William
Stern, Fred
Stiles, Lynn D.
Stiles, W. H.
Stimpson, Harold
Stokes, C. E.
Stone, J. Everett
Stowe, Griswold
Studebaker, C. D.
Swaney, C. R.
Sweeney, Edward C.
Sweeney, Edward C., Jr.

T

Tallman, A. V. W.
Taylor, M. C.
Tenney, John, Jr.
Terhune, Richard
Thalhimer, A. F.
Thomas, J. W.
Thomas, L. H.
Thomas, W. G.
Thompson, Kennedy M.
Thornton, A. D.
Thorstensen, C. E.
Tobin, H. B.
Tompkins, L. Douglas
Townsend, A. F.
Tucker, A. Y.
Turner, M. A.
Tweedy, O. S.
Tyke, A. T.

V

Van Alst, Milton
Vance, L. T.
Van Cleef, Felix
Van Derbeck, Frank H.
Van Emmerik, J. A.
Van Etten, J. de C.
Van Kleeck, Chester
Vaughn, L. A.
Vincent, R.
Voorhees, Frank D.
Voorhees, John J., Jr.
Vorhis, H. S.

W

Waldo, Frank
Walsh, Thos. F.
Walsh, Wm. C.
Wareham, Arthur
Warren, A. W.
Watkinson, George
Watson, John J., Jr.
Weber, Edward
Weber, Lothar E.
Weeks, P. S.
Weida, H.
Weitling, Wm. W.
Welton, Spencer
Weston, J. C.
Westren, J.
Whitehead, A.
Whitehead, Richard R.
Whitehead, Robert V.
Whitenack, W. A.
Whyte, J. A. E.
Wies, Geo. A.
Wildman, W. W.
Williams, E. S.
Willis, R. S.
Wilson, Dudley
Wilson, C. T.
Wilson, E. H.
Wilson, Henry C.
Wilson, W. E.
Wise, Paul F.
Wood, Charles E.
Wood, John R.
Wood, LeRoy
Wood, Theodore
Woodard, S. P.
Woodbury, R. B.
Woodward, K. D.
Work, B. G.
Wright, Saml.

Y

Young, C. T.
Young, Philip E.
Yule, W. H.

Z

Zeiss, Albert

RETIRING BOARD OF DIRECTORS' AND EXECUTIVE COMMITTEE MEETING.

THE retiring board of directors met at the Union League Club, New York City, January 6, at 12.30 P. M., and confirmed all the acts of the Executive Committee during the past year. It was decided to combine the Committee on Uniform Crude Rubber Contract with the Committee on Crude Rubber Nomenclature and under the former title. The directors passed a resolution recommending that the name, "The Rubber Club of America, Inc.," be changed to "The Rubber Association of America." It was resolved that in the future a member to be eligible to associate membership must be connected with a firm member. The directors voted that the association should be represented at the National Security League's Congress of Constructive Preparedness to be held in Washington, D. C., January 25-27. Amedee Spadone, Gutta Percha & Rubber Manufacturing Co., New York City, was the delegate appointed to represent the Rubber Club.

The Executive Committee then went into session and the following firm members were elected:

FIRM MEMBERS.

A. J. Bates & Co., Inc., New York City.—Representative, Frederick B. Nickel.

The Carter Bell Manufacturing Co., New York City.—Representative, W. H. Chichester.

Norwalk Tire & Rubber Co., Norwalk, Connecticut.—Representative, Dr. David Spence.

Hazen-Brown Co., Brockton, Massachusetts.—Representative, Max Brown, transferred from Associate Membership.

Panther Rubber Manufacturing Co., Stoughton, Massachusetts.—Representative, Frank Berenstein.

Manhasset Manufacturing Co., Providence, Rhode Island.—Representative, Roland H. Ballou, transferred from Associate Membership.

The Interocean Oil Co., New York City.—Representative, W. G. Thomas, Jr.

The Standard Tire & Rubber Manufacturing Co., Cleveland, Ohio.—Representative, M. J. Gillen.

Maguire Rubber Co., New York City.—Representative, J. B. Maguire.

Eugene Doherty Rubber Works, Inc., Brooklyn, New York.—Representative, Philip A. Doherty.

Rubber Insulated Metals Corp., Plainfield, New Jersey.—Representative, Charles P. L. Huston.

Danversport Rubber Co., Boston, Massachusetts.—Representative, Frederic Barlow.

The H. F. Taintor Manufacturing Co., New York City.—Representative, Harry Taintor.

E. M. & F. Waldo, New York City.—Representative, Edward M. Waldo.

Frank B. Ross & Co., New York City.—Representative, Frank B. Ross.

C. L. Hawthaway & Sons, Inc., Boston, Massachusetts.—Representative, Clarence L. Hawthaway.

Jenckes Spinning Co., Pawtucket, Rhode Island.—Representative, F. L. Jenckes.

The Luzerne Rubber Co., Trenton, New Jersey.—Representative, Bruce Bedford or C. Dudley Wilson.

Monatiquot Rubber Works Co., South Braintree, Massachusetts.—Representative, Robert C. Harlow.

The applications for Associate Membership were laid on the table for consideration at the next meeting.

The Annual Meeting of the Rubber Club of America, Inc.

THE annual meeting of The Rubber Club of America, Inc., was held at 2:30 P. M., January 8, at the Waldorf-Astoria, New York City. After the reading of the minutes of the previous meeting, the reports of the officers, covering the club's many activities of the past year, were read and adopted.

SECRETARY'S REPORT.

Since our last annual meeting the firm membership of The Rubber Club of America, Inc., has increased to 231 firms in the rubber and allied industries, which is an increase of 20 per cent, and our associate membership has increased from 227 individuals connected with the rubber industry to 242.

During the eleven months covered by this report the executive committee has held five meetings and the board of directors has held one session. Numerous committee meetings have been held at the association headquarters, where the directors' room is always at the disposal of our membership and for meeting purposes.

The organization of several groups of manufacturers as divisions of The Rubber Club of America, Inc., is very gratifying, as is the affiliation of the Rubber Reclaimers' Club as a division.

The annual mid-summer outing was held for the second year at the Vesper Country Club at Lowell, Massachusetts, and the attendance was over 300, and over 125 more than at the outing the year previous. Special trains were run from Akron and New York, and the outing was voted the most enjoyable of any in the history of the association.

The banquet of 1916 was held at the Waldorf-Astoria on the evening following the annual meeting on February 2, 1916. The attendance was nearly 300, which was a substantial increase over the previous year.

Since our last annual meeting we have lost the following members by death:

Richard H. Linburg, president of the United and Globe Manufacturing Cos., died at Trenton, New Jersey, January 5, 1916.

William Lyall, president of The Brighton Mills, Passaic, New Jersey, died in New York City January 13, 1916.

Charles Henry Arnold, of Arnold & Zeiss, died in New York City February 20, 1916.

John Hopewell, former president of The Reading Rubber Manufacturing Co., died at Washington, D. C., March 28, 1916.

George David Hazen, of The Hazen Brown Co., died at Brockton, Massachusetts, April 13, 1916.

Le Baron C. Colt, vice-president and general manager of The National India Rubber Co., died at Bristol, Rhode Island, May 25, 1916.

F. C. Breakspear, with A. G. Spalding & Bros. Manufacturing Co., Chicopee, Massachusetts, died at New York City, June 2, 1916.

James H. Seiberling, president and general manager of The Indiana Rubber & Insulated Wire Co., died at Jonesboro, Indiana, July 7, 1916.

Robert J. Bowes, with the Lawrence Felting Co., died at Millville, Massachusetts, on September 11, 1916.

Paul Schmidt, secretary of the Rubber & Guayule Agency, Inc., died at Englewood, New Jersey, on September 13, 1916.

Philip Braender, president of the Braender Tire & Rubber Co., died at White Plains, New York, November 4, 1916.

John Henry Flint, president of the Tyer Rubber Co., president of the New England Rubber Club, 1905-1906, and director, 1902-1905, 1905-1916, died at Andover, Massachusetts, on November 29, 1916.

Consideration of the reports of four special committees was then taken up.

A UNIFORM CRUDE RUBBER CONTRACT.

First came that of the Committee on a Uniform Crude Rubber Contract, H. Stuart Hotchkiss, chairman. As the result of long deliberation, a set of rules for the regulation of the traffic in crude rubber had been previously submitted to the membership by mail for study, and was then discussed paragraph by para-

graph and finally adopted as reprinted below, subject to later amendments by the Executive Committee if found necessary or desirable. By this action the Club did not take the position of discouraging special contracts between manufacturers and dealers, the idea being to provide a workable standard of rules and definitions to govern in all cases where rubber is sold "under the rules of The Rubber Club of America, Inc." It is the belief of the Committee that the interests of the manufacturer, the importer and dealer have been protected. The revised and adopted draft follows:

RULES.

All sales purporting to be made subject to the rules of The Rubber Club of America, Inc., shall be considered as made subject to the following rules:

1. STANDARD QUALITIES. Standard qualities consist of the following:

- (a) *Hevea* First Crêpe
- Hevea* Ribbed Smoked Sheets
- Hevea* Plain or Smooth Smoked Sheets and/or Biscuits
- Hevea* Unsmoked Sheets and/or Biscuits

to be understood as per standard samples on file with The Rubber Club of America, Inc., at New York and at Akron, Ohio, said samples to be renewed at least once every six months.

Para Standards—to be as understood in New York.

- (b) Other qualities—to be as described in sales contract.

2. OTHER QUALITIES. Where a parcel of rubber is sold under one of the standard descriptions or under a description superior to the standard for a definite shipment, arrival, delivery, or on the spot, and is found inferior in whole or in part, the buyer shall have the option of rejection and the quantity so rejected, whether the whole or any portion, shall not constitute a delivery on the contract. Should the time for delivery have expired the seller shall have ten days to replace the quantity rejected at the original point of arrival or delivery in the United States of America or at the port of New York, provided that such quantity was in the opinion of the arbitrators a bona fide tender against the contract. In case the seller does not replace, the buyer at his option may cancel the contract, or buy and charge the difference, if any, to the seller.

3. Where a parcel of rubber is sold with a description of quality inferior to that specified in Rule 1, Section A, and upon delivery is found inferior in whole or in part, then the buyer must accept the same with allowance, provided such allowance in the opinion of the arbitrators, be not more than two cents per pound on the inferior portion; but should the parcel, in whole or in part, be rejected, the seller shall substitute proper quality to fulfil his contract at the original point of delivery in the United States of America or Canada or at the Port of New York within ten days from the time of rejection or within the time for delivery as the case may be. In case the seller does not replace, the buyer at his option may cancel the contract, or buy and charge the difference, if any, to the seller.

4. The word "Ton" shall mean a ton of 2,240 pounds.

5. DELIVERY WEIGHTS. Final delivery on any contract to be within 100 pounds of the weight contracted for, but in any case the nearest weight of the contract quantity that the average weight of the packages of the final tender admits. But where it is found impossible to deliver within 100 pounds, taking the average weight of the packages tendered, any deficiency or excess, shall be invoiced or invoiced back, as the case may be, at the market price on the date of delivery. Should buyer and seller fail to agree on the market valuation at such time, same is to be fixed, without fee, by the Arbitration Committee.

6. The words "about," or "more or less," when used to define quantities contracted for, shall mean the nearest amount which seller can fairly and reasonably deliver, but no excess or deficiency shall be greater than 2½ per cent. This rule shall apply only on specific lots.

7. DECLARATION OF VESSELS. After declaration, should the vessel, or vessels, carrying any portion of a contract calling for shipment or arrival be lost, such contract is to be cancelled to the extent of the goods lost.

Should the shipment not be declared by the seller prior to the loss of the vessel carrying the shipment, such loss shall not vitiate the contract or any part thereof.

8. **PROMPT SHIPMENT.** The term "prompt shipment" from foreign ports shall, under normal conditions, be considered as follows:

Within a period of—

Fifteen days, if shipped from Great Britain or Europe.

Thirty days, if shipped from the Far East.

Thirty days, if shipped from the Amazon Valley.

9. **CHECKING WEIGHTS AND APPROVING QUALITIES.** The buyer shall have the option of having his representative at the dock or warehouse to check the weights or to pass upon the quality. In the event that weights or quality are approved the responsibility of the seller ceases in respect to said weights or quality.

In event buyer does not exercise this option, actual gross weights with proper tare allowance "ex dock" or "ex store" at port of arrival shall govern weights and point of delivery in the fulfilment of a contract.

10. **SELLER'S RESPONSIBILITY.** In the event of the seller making shipment direct to the buyer, then the seller's responsibility for the safety of the goods does not cease until the goods are delivered to the transportation company or its agents. Should buyer designate an agent or representative to take delivery, seller's responsibility ceases when delivery order is in the possession of said agent or representative and goods have passed the weighmaster's scales.

11. **WEIGHING AND TARING.** Unless otherwise stated in the contract, all tenders of plantation rubber or rubber in bales, may be weighed in drafts at the option of the seller. Rubber shall be weighed gross to the 1 pound, if in drafts, and shall be weighed to the ½ pound, if weighed by the package. Cases tared shall be weighed to the ½ pound. Paras shall be grossed and tared case by case to 1 pound. All other grades of rubber which cannot be readily tared are to be billed at tares guaranteed by seller.

12. **MONTHLY DELIVERY CONTRACT.** Where a contract calls for monthly delivery, arrival or shipment, each month's or specified part of a month's delivery or shipment is to be treated as a separate contract.

13. **OPTION OF DELIVERIES.** Where rubber is sold for shipment from a foreign port, the seller may tender in fulfilment of the contract rubber not coming from that port, provided it is of the same description and quality as the rubber named in the contract and is tendered according to the terms of the contract so far as the time and place of delivery are concerned.

14. **NOTIFICATION OF REJECTIONS.** If acceptance of any parcel of rubber is refused by a buyer, notification must be given the seller in writing within seven days after receipt in the buyer's factory, stating specific reasons for such rejection. In case of claims or rejection rubber shall remain in original cases pending final determination.

15. **SPECIAL AGREEMENTS.** Any special agreement expressed in a contract supersedes any of these rules to the extent the rule is affected thereby.

16. **FAILURE TO FULFIL CONTRACT.** Whenever it may be admitted by the seller or decided by arbitration that the seller has failed to fulfil the terms of a contract then the buyer may, at his option, cancel the contract, or purchase quality called for in the open market charging the difference, if any, to the seller.

Whenever it may be admitted by the buyer or decided by arbitration that the buyer has failed to fulfil the terms of a contract, then the seller shall be released from all obligations connected thereto, and buyer shall be responsible for any loss occasioned by said failure.

17. **GOVERNMENT TAXES.** On contract for future delivery any import duty or tax imposed by the United States Government on crude rubber shall be for the account of the buyer.

18. **GUARANTEE OF SHRINKAGE.** When the rubber is sold on a guaranteed shrinkage in washing and drying, buyer must render the return to the seller within three months from the time of delivery.

19. **PLACE OF DELIVERY.** It is understood that when goods are sold "ex dock" or "ex store New York," the point of delivery shall mean the Port of New York.

20. **MISCELLANEOUS.** A contract calling "for delivery" shall be construed to mean that the rubber shall be weighed and ready for shipment or tender to the buyer during the period stipulated in the contract.

A contract calling "for arrival" during a certain period shall be construed to mean that it shall arrive upon a vessel due at the port named during the time stipulated in the contract and is to be tendered or shipped as soon thereafter as conditions permit.

A contract calling for shipment from a certain country or countries or a specified foreign port during a certain period or periods shall be construed to mean that the date of the bill of lading at

the port of shipment covering such goods called for in the contract shall be within the time stipulated for shipment.

21. **ARBITRATION.** All disputes between buyer and seller are to be settled by arbitration by the arbitrators of The Rubber Club of America, Inc., the award of the arbitrators to be final.

REPORT OF THE PREPAREDNESS COMMITTEE.

Tremendous changes in international and national events bring up the question whether our industrial organizations cannot play a much broader and more useful part than has generally been done in the past. It is difficult at this distance to appreciate the progress made in Europe toward combination of effort and resources in individual industries, as well as among industries, all of which is being hastened and directed by the government. This movement is likely to continue and develop long after the war, and much of its incentive is based upon American competition. Manufacturers are burying their antagonisms of long standing and coöperating with each other to a degree astonishing to one acquainted with British conservatism of the past.

The national council of defense and the national research committee are laying out very comprehensive plans with similar tendencies for this country. The Rubber Club has a remarkable opportunity to display leadership in the mobilization of our industrial resources and in the developing of that high type of coöperation, which will become more and more essential as these movements progress. For instance, it has already been brought to the attention of Washington that the entire rubber industry would be crippled in the event of hostilities with any important maritime nation, and probably the research committee will recommend that research work be carried on in connection with either synthetic rubber or the development of a supply of natural rubber within our own borders. This latter problem looks more difficult than the former, but, considering the absolute dependence of the rubber industry upon its supply of basic material, is it not the part of good business to have the industry undertake to insure that supply by the best means that our scientific men can point out? Why not have the Rubber Club appoint a committee of representative technical men within the industry to coöperate with the research committee and lay plans for the carrying on of research work by the industry if that appears to be the best plan? Starting with rubber, many other problems will come to mind, which could far better be investigated by the industry than by individual manufacturers. The automobile people have shown the world the advantage of unselfish coöperation, and the rubber industry perhaps represents the opposite extreme.

I should like to suggest, therefore, that the existing preparedness committee be discharged at the coming annual meeting, and that the directors of the Rubber Club organize among their active members a group to make this general problem an important operating feature of the Rubber Club. An industry that is capable of indefinite expansion, as the rubber industry is, will probably do more for its individual members upon a coöperative than upon an extremely competitive basis. Not only that, but the tendency of the world will force us in this direction in spite of ourselves. So is it not the part of intelligent business men to lead rather than be driven in the right direction?

In accordance with the suggestion of R. B. Price, chairman of the Preparedness Committee, contained in his report read by the secretary in Mr. Price's absence, this committee was discharged and its recommendations referred to the Executive Committee with power to take such action as may be deemed wise. In this connection President Firestone pointed out the desirability of a Committee on Research to work out the technicalities in the development of rubber growing and synthetic rubber, and anything that pertains to the development and betterment of the rubber industry.

THE LEGISLATIVE COMMITTEE IS HEARD FROM.

Frederic C. Hood, chairman of the Legislative Committee, had prepared no report, but addressed the members upon the important work that ought to be undertaken. He emphasized the importance of gathering facts and their proper presentation to governmental committees, pointed out the shortcomings of the average business man as an orator, and stated emphatically that such problems as the proposed import duty on crude rubber and the National Workmen's Compensation Act demand the attention of a legislative committee in which the utmost confidence is reposed and which will be accorded the full support of the Club.

At the annual meeting of the Rubber Club of America, held at the Hotel New Yorker, New York City, on January 1, 1917, the following board of directors was elected for the ensuing year:

William E. Bruyn, L. Littlejohn & Co., New York City.
 Van H. Cartmell, Kelly-Springfield Tire Co., New York City.
 Harvey S. Firestone, Firestone Tire & Rubber Co., Akron, Ohio.

H. Stuart Hotchkiss, United States Rubber Co. System, New York City.

William J. Kelly, Arnold & Zeiss, New York City.

P. W. Litchfield, Goodyear Tire & Rubber Co., Akron, Ohio.

J. S. Lowman, Philadelphia Rubber Works Co., Akron, Ohio.

W. O. Rutherford, The B. F. Goodrich Co., Akron, Ohio.
 Charles T. Wilson, Charles T. Wilson Co., Inc., New York City.

Tracy S. Lewis, Beacon Falls Rubber Shoe Co., Beacon Falls, Conn.

John A. Lambert, Acme Rubber Manufacturing Co., Trenton, New Jersey.

Charles A. Daniel, Quaker City Rubber Co., Philadelphia, Pennsylvania.

AMENDMENTS TO THE CONSTITUTION AND BY-LAWS.

The proposed amendment to Article VI, Section 2, of the Constitution and By-Laws, a draft of which had previously been submitted to the membership, was unanimously adopted. It



J. A. LAMBERT.



T. S. LEWIS.



W. O. RUTHERFORD



P. W. LITCHFIELD.



C. A. DANIEL.



VAN H. CARTMELL,
First Vice-President.



HARVEY S. FIRESTONE.
President.



H. STUART HOTCHKISS,
Second Vice-President.



W. E. BRUYN.



C. T. WILSON



H. S. VORHIS,
Secretary



J. S. LOWMAN.



W. J. KELLY.

DIRECTORS OF THE RUBBER CLUB OF AMERICA, INC.

provides for a Committee on Arbitration and specifies its duties as follows:

A Committee on Arbitration to consist of seven members, four of whom shall be manufacturers and three crude rubber importers. The chairman of such committee shall be chosen by the members from their own number for a term of three years, and the term of each of the additional members shall be three years, except that at the time when this committee shall be originally appointed the six members then appointed, other than the chairman, shall decide by lot which of their number shall serve for periods of one, two, and three years respectively, two members of the committee being assigned to each class, and that thereafter two members shall be appointed by the board of directors or by the Executive Committee in each year. If any vacancies should occur in this committee, such vacancies may be filled by the board of directors or by the Executive Committee at any regular or special meeting.

DUTIES. This committee shall have complete supervision in respect to all matters for arbitration referred to The Rubber Club of America, Inc., and shall make rules and regulations for the conduct and disposition of all matters submitted to arbitration subject to the approval of the board of directors or of the Executive Committee. It shall provide a form of agreement not inconsistent with existing provisions of law by which, so far as practicable, the decisions of the arbitrator or arbitrators shall be as effective as judgments of the Supreme Court of the State of New York. It shall compile, and from time to time revise, and keep a list of qualified persons, not less than 25, willing to act as arbitrators under these rules, and who shall be members of The Rubber Club of America, Inc. This list shall be known as "The List of Official Arbitrators of the Rubber Club of America, Inc."

The proposed change in Article III of the Constitution and By-Laws was also adopted to read:

Any person connected with a corporation or firm, and engaged in the rubber industry in the United States of America or the Dominion of Canada, which corporation or firm has been elected a firm member of this association, shall be eligible to membership.

CHANGE OF NAME.

The recommendation of the board of directors that the name of the organization be changed to The Rubber Association of America, as more accurately describing its real character and activities, was then put to a vote and unanimously adopted.

OFFICERS RE-ELECTED.

After the annual meeting the new board of directors went into session and the following officers and Executive Committee of The Rubber Club of America, Inc., were reelected:

OFFICERS.

President, Harvey S. Firestone, Firestone Tire & Rubber Co., Akron, Ohio.

First vice-president, Van H. Cartmell, Kelly-Springfield Tire Co., New York City.

Second vice-president, H. Stuart Hotchkiss, United States Rubber Co. System, New York City.

Secretary and treasurer, Harry S. Vorhis, The Rubber Association of America, New York City.

EXECUTIVE COMMITTEE.

Harvey S. Firestone, Chairman, Firestone Tire & Rubber Co., Akron, Ohio.

George B. Hodgman, Hodgman Rubber Co., Tuckahoe, New York.

William E. Bruyn, L. Littlejohn & Co., New York City.

Van H. Cartmell, Kelly-Springfield Tire Co., New York City.

Paul W. Litchfield, The Goodyear Tire & Rubber Co., Akron, Ohio.

H. Stuart Hotchkiss, The United States Rubber Co. System, New York City.

STANDING COMMITTEES.

The president of the Rubber Club has appointed the following committees:

LEGISLATIVE COMMITTEE.

Frederic C. Hood, chairman, Hood Rubber Co., Watertown, Massachusetts.

H. Stuart Hotchkiss, The United States Rubber Co. System, New York City.

One member yet to be chosen.

ARBITRATION COMMITTEE.

William E. Bruyn, L. Littlejohn & Co., New York City.

Andrew H. Brown, Meyer & Brown, New York City.

W. G. Ryckman, New York City.

William F. Bass, General Rubber Co., New York City.

M. L. Cramer, Michelin Tire Co., Milltown, New Jersey.

Horace De Lisser, Ajax Rubber Co., Inc., New York City.

R. B. Woodbury, Hood Rubber Co., Watertown, Massachusetts, and as alternates:

H. A. Astlett, H. A. Astlett & Co., New York City.

Clement B. McKay, The Fisk Rubber Co., New York City.

NOMINATING COMMITTEE.

Frederick H. Jones, chairman, Tyer Rubber Co., Andover, Massachusetts.

William J. Kelly, Arnold & Zeiss, New York City.

W. O. Rutherford, The B. F. Goodrich Co., Akron, Ohio.

Henry C. Pearson, India Rubber Publishing Co., New York City.

Harry G. Fisk, The Fisk Rubber Co., Chicopee Falls, Massachusetts.

AUTHING COMMITTEE.

E. E. Huber, chairman, Eberhard Faber, Brooklyn, N. Y.

William G. Grieb, Ajax Rubber Co., Inc., New York City.

BANQUET COMMITTEE.

William T. Cole, chairman, Fabric Fire Hose Co., New York City.

Francis R. Henderson, Henderson & Korn, New York City.

Tracy S. Lewis, Beacon Falls Rubber Shoe Co., Beacon Falls, Connecticut.

ROUTING COMMITTEE.

To be selected later by the executive committee.

At a meeting of the executive committee, held January 19, 1917, at the Whitehall Club, 17 Battery Place, New York City, the following firm and associate members were elected:

NEW FIRM MEMBERS.

Rosenwald & Weil, Chicago, Illinois—Representative, H. T. Kessler.

B. S. Ellis, New York City—Representative, B. S. Ellis.

E. S. Kuh & Valk Co., New York City—Representative, Chas. Thorstensen.

Robinson Co., New York City—Representative, Thos. A. Desmond.

T. C. Ashley & Co., Boston, Massachusetts—Representative, Archer S. Pratt.

Somerset Rubber Reclaiming Works, New Brunswick, New Jersey—Representative, A. Marcus.

Chadbourne & Moore, Boston, Massachusetts—Representative, Joseph H. Chadbourne.

Plymouth Rubber Co., Canton, Massachusetts—Representative, Abraham Sydeman (transferred from associate membership).

ASSOCIATE MEMBERS.

Geo. W. Skirm, Trenton, New Jersey, Globe Rubber Tire Manufacturing Co.

E. S. Sloat, Patterson, New York, Mishawaka Woolen Manufacturing Co.

Raymond S. Willis, East Orange, New Jersey, United States Rubber Co.

J. M. S. Carroll, Montreal, Canada, Canadian Consolidated Rubber Co., Limited.

Frank C. Foley, New York City, The Fisk Rubber Co.

Wm. E. Kavenagh, Akron, Ohio, Swinehart Tire & Rubber Co.

Charles W. Barnes, New York City, United States Rubber Co.
Merton A. Turner, South Braintree, Massachusetts, Monatiquot Rubber Works Co.

James H. Stedman, South Braintree, Massachusetts, Monatiquot Rubber Works Co.

DIVISIONS' MEETINGS.

THE following meetings of the divisions of the Rubber Club were held at the Waldorf-Astoria on Monday, January 8:

THE RUBBER & FIBER SOLE MANUFACTURERS' DIVISION was organized, and a Constitution and By-laws adopted. W. H. Yule, The B. F. Goodrich Co., Akron, Ohio, was elected chairman and William M. Gunlock, United States Rubber Co. System, vice-chairman. The following Executive Committee was also elected: W. H. Yule, chairman, The B. F. Goodrich Co.; William Gunlock, United States Rubber Co. System; George E. Hall, Boston Woven Hose & Rubber Co., Cambridge, Massachusetts; C. H. Oakley, Essex Rubber Co., Inc., Trenton, New Jersey; George B. Dryden, Dryden Rubber Co., Chicago, Illinois, and an additional member who will be appointed later.

THE RUBBER SUNDRIES MANUFACTURERS' DIVISION in meeting elected Frederick H. Jones, Tyer Rubber Co., chairman, Andover, Massachusetts; W. O. Rutherford, vice-chairman, The B. F. Goodrich Co., Akron, Ohio, and the following Executive Committee: Frederick H. Jones, chairman, Tyer Rubber Co., Andover, Massachusetts; Russell Parker, Parker, Stearns & Co., Brooklyn, New York; Charles J. Davol, Davol Rubber Co., Providence, Rhode Island; George B. Hodgman, Hodgman Rubber Co., Tuckahoe, New York; E. E. Huber, Eberhard Faber, Brooklyn, New York; Thomas W. Miller, Faultless Rubber Co., Ashland, Ohio.

THE MECHANICAL RUBBER GOODS MANUFACTURERS' Division elected William T. Cole chairman, Fabric Fire Hose Co., New York City; John J. Voorhees, vice-chairman, Voorhees Rubber Manufacturing Co., Jersey City, New Jersey. The Executive Committee consisting of five members will be appointed later.

THE RUBBER RECLAIMERS' CLUB met and voted to organize as a division of the Rubber Club to be known as the Rubber Reclaimers' Division. Captain Francis H. Appleton was elected chairman.

Harry S. Vorhis was elected secretary and treasurer of all the divisions.

AMERICAN COMPETITION IN TIRES RESENTED.

IN a recent Trade Supplement published by the "London Times" a prominent British rubber manufacturer writes as follows:

From the West has come a Colossus which they do fear, and with good cause. It seems a harsh thing to say, but there can be no doubt that the American rubber trade has deliberately set out to capture the business of the British rubber manufacturers whilst the latter are preoccupied and handicapped by war work. Before the war the Americans had secured little or no hold on the British market, and less, to use an Irishism, in the Colonies. Now let the figures speak. In motor tires alone, excluding those fitted to vehicles, the imports into Great Britain have been as follows:

Year 1914	£ 270,550
Year 1915	1,225,422
First half of 1916	1,063,585
The total United States exports of motor tires for the years ended June 30 being:	
1914	\$ 3,505,267
1915	4,963,270
1916	17,936,227

Needless to say the huge increase for 1916 is not a newly-created trade, but the result of a deliberate campaign of flooding our Colonies and other markets with huge quantities of American tires.

The ordinary business man at this stage would naturally ask why the government does not intervene to prevent the import of

unwanted goods and the consequent export of gold to pay for them by a Prohibition of Import Order. But here we enter the realms of high diplomacy. An order was actually made, and withdrawn at the eleventh hour, as it was stated in the House of Commons that an arrangement existed with American manufacturers which precluded the possibility of prohibiting the import of these goods.

It is certain, however, that the first pioneers of British plantation rubber, when they smuggled away the *Hevea* seeds from Brazil, little thought that by giving Britain control of the world's supply of rubber they would be doing at the same time an injury to British rubber manufacturers. Such, however, is in effect what has happened, as the arrangement with American manufacturers was to allow them supplies of British rubber in consideration of their executing all their orders for neutral European countries through Great Britain. If, therefore, there had been no British rubber there would be no American tires now coming into Great Britain.

The planter is inclined to take the view that because he is able to sell his production at a handsome profit all is well with it. He should, however, not wait for the writing on the wall. Some of the world's largest consumers are developing their own estates, mainly to get over this bogy of variability, and the day may come when a rubber will have to stand or fall on its quality and its attainment of a certain standard.

All this points to the necessity of combination between the producing and manufacturing sides of the industry. A joint research commission should therefore be formed composed of the best technical men obtainable on both sides, and a definite program carried out, in the interests of the industry.

It seems a somewhat unfortunate state of affairs that whilst of the expected world's production of crude rubber for 1916 about 75 per cent will be produced within the British Empire, probably not more than about 12 per cent of it will be consumed by British manufacturers. Of the remainder probably 62½ per cent will be used by the United States.

They will probably need for 1916 at least 125,000 tons, which on a rough and ready calculation may be taken to represent the production of goods of a selling value of £125,000,000. Three of the principal concerns will together show a total turnover for the current year of approximately £50,000,000.

As to whether any considerable portion of this huge business could be done on this side under different economic conditions is open to doubt. To commence with it is attributable to a great extent to the universal prosperity and the high wages of the working classes in the States. At the end of this year it is expected that the total number of cars registered in the United States will be 3,250,000, or approximately one to every 32 persons. The consumption of tires in the upkeep of these cars is of course enormous.

The figures for the British rubber trade compared with those for the United States seem small, but none the less it ranks as one of the more important industries of the country, with an output of from twenty to twenty-five millions sterling. At any rate, it is a sufficiently important national asset for the government and nation to see that it is not swallowed up by the American Goliath.

In conclusion, one may be permitted to wonder why, when the nation is being taxed to the uttermost farthing in every direction, neutrals should not be made to bear a slight contribution towards the cost of the war, from which they are profiting so greatly. An export duty on crude rubber sent out of the British Dominions of only 6d. per pound would bring in probably £6,000,000 and would certainly not reduce the exports by one pound. It would, moreover, not make the price prohibitive, as a sixpenny rise in the price of rubber is by no means rare. But perhaps the Rubber Growers' Association would have much to say on such a proposal.

DIRECT SHIPMENT OF RUBBER GOODS TO PORTUGAL.

The following notification has recently been received from the British Consulate General at New York City:

I have to inform you that Portugal may now be regarded as on the same footing as other allied countries in Europe, in connection with the rubber guarantee.

It will, therefore, be in order for manufacturers to ship rubber goods by direct steamer to Portugal in the future.

CORRECTION.

In the notice concerning the resignation of the superintendent of Parker, Stearns & Co. appearing in the January number of THE INDIA RUBBER WORLD, the name should read F. G. Littell, instead of F. G. Hettell.

The New York Automobile Show.

A GAIN previous records have been surpassed at the seventeenth annual National Automobile Show held at the Grand Central Palace, New York City, from January 6 to 13. Attendance and business were the greatest in history and a larger number of cars and chassis—340 in all—was shown by 98 firms. Accessory exhibitors were not as numerous as last season, although occupying 6,000 square feet more space, but their products were no less varied nor interesting, and really sounded the keynote of the show. Of the 230 firms on the official program many were manufacturers of goods containing rubber. As in the past, several large tire concerns did not exhibit but the many cars shown displayed most of the leading tires and treads, while the Firestone, Goodrich, Ajax and Century firms were represented by advertisements in the program. Among the exhibits of interest to readers of *THE INDIA RUBBER WORLD* may be mentioned the following:

TIRES AND TUBES.

The Marathon Tire & Rubber Co., Cuyahoga Falls, Ohio, showed its "Angle" and "Runner" tread tires, built up in the center where the most wear comes; also its extra heavy red tubes and regular gray tubes.

The Dayton Rubber Manufacturing Co., Dayton, Ohio, displayed the Dayton pneumatic tire with its heavy central rib and open-weave breaker strip forming a reinforcement around the rubber and riveting it thoroughly to the carcass.

Century, hand-made, oversize tires and Century red inner tubes were the products of the Rubber Insulated Metals Corporation, Plainfield, New Jersey. A convenient type of rubber-handled, insulated pliers for safety in repairing the electrical equipment of motor cars was also offered.

General tires were shown by the General Tire Co., Akron, Ohio.

The Woodworth Manufacturing Corporation, successor to the Leather Tire Goods Co., Niagara Falls, New York, demonstrated the construction of the Woodworth Trouble-Proof tire with its strip of chrome leather inside the shoe where it is not subjected to the action of moisture and dirt; also an inner tube with the grain of the several plies running in different directions to reduce tearing to a minimum. The Woodworth Tread and Woodworth Overshoe, both of studded leather, were shown together with a line of tire accessories including tire boots, inner sleeves, inside patches, fan belts and Easylon tire chains.

The air-retaining qualities of Bonner tubes, which are claimed to be self-closing when punctured, was demonstrated by the Brunswick-Balke-Collender Co., Chicago and New York. The tread, into which is vulcanized a strip of non-stretchable fabric, is built to extra thickness by the laminated process and turned inside out before joining the ends. The larger circumference thus becomes the inner circumference and when the tube is inflated the thickened rubber tread is automatically compressed to a point where it will close all ordinary punctures instantly and without loss of air pressure.

TIRE REPAIR DEVICES.

The Adamson Manufacturing Co., East Palestine, Ohio, featured four vulcanizers and Adamson repair gum requiring no cement. Of the vulcanizers Model "U" is for tubes and casings; Model "T" for inner tubes only; Model "S" for private garages and repair shops, and Model "M" for cycle tubes.

The C. A. Shaler Co., Waupun, Wisconsin, had a complete exhibit of similar vulcanizers, small portable and garage installations, with heat from gasoline, alcohol, electricity and steam.

The exhibit of Stevens & Co., New York City, consisted of the Sampson repair kit for inner tube work, including the Sampson Featheredge Puncture plug, an ingenious quick-repair device

composed of two rubber disks with perforated metal centers and a screw wire to draw the disks together. The hole is punched round to prevent tearing, spread with special pliers, the plug inserted and screwed up tight. Upon breaking off the wire below the surface of the plug and inflating the tire, the plug conforms to the inside of the casing as flat as a patch, and no wear, chafing or cutting is said to be possible.

The Eastern Rubber Co., Philadelphia, Pennsylvania, demonstrated Magic Rubber Mend, an inexpensive preparation for repairing quickly without vulcanization all articles of soft rubber, including punctured tubes. The result is said to be permanent and unaffected by heat, cold, moisture or dry air.

TIRE TOOLS AND ACCESSORIES.

The space occupied by the Stewart-Warner Speedometer Corporation, Chicago, Illinois, was devoted to an attractive presentation of several well-known and popular devices, including the Stewart engine-driven pump.

The Kellogg Manufacturing Company, Rochester, New York, had on view a motor-driven pump either air or water cooled.

The Crane tire pump was featured in the exhibit of the Bay State Pump Co., Boston, Massachusetts.

Air compressors were shown by the Auto Compressor Co., Wilmington, Ohio, and a two-stage type with models for all requirements was offered by the United States Air Compressor Co., Cleveland, Ohio.

Jacks and other specialties were offered by Lane Bros. Co., Poughkeepsie, New York; F. W. Mann Co., Milford, Connecticut; Moreau & Pratt, Inc., New York City; Weaver Manufacturing Co., Springfield, Illinois.

Standweld rims, seamless steel and brass tubing comprised the display of the Standard Welding Co., Cleveland, Ohio.

The simple and effective device of the Eureka Rim Compressor, Inc., Addison, New York, for the quick removal of tires from transversely split rims attracted favorable attention.

TOPS AND TOP MATERIALS.

L. J. Muttly Co., Boston, Massachusetts, showed its well-known Bull Dog rubberized mohair and cotton cloths for automobile tops and slip covers; also Numotor fabrics for top and seat cover purposes.

Neverleek for the same purposes was displayed by F. S. Carr Co., Boston, Massachusetts. Three surfaces in imitation of grain leather were offered; one dull and two semi-bright.

The Pantasote Co., New York City, demonstrated the sterling qualities of Pantasote for motor-car tops. This waterproof material is not merely a rubberized cloth, but consists of four layers, the surface coating with grain finish, fine cotton fabric, cementing gum, and a lining fabric of coarse weave.

The Detroit Weatherproof Body Co., Detroit, Michigan, had on view its all-weather, detachable top of high-grade waterproof material which converts the ordinary car into a limousine and is ideal for changeable weather. Patented Flexible sliding doors upon opening disappear instantly into the permanent roof, and the entire side sections may be quickly removed when so desired. This top weighs only about 50 pounds more than the ordinary type, including an electric dome lamp ready for connection at the dash.

The Laidlaw Co., Inc., New York City, showed Mortex for tops and cover purposes.

RUBBER ACCESSORIES.

Essex inner tubes—Royal Blue, Master Red and Champion Gray—were the principal exhibit of the Essex Rubber Co., Trenton, New Jersey. The company also manufactures a line of miscellaneous rubber accessories, including blow-out patches, tire

plasters, outer boots, reliners, pump, generator and lamp tubing, brake band lining, radiator hose, spring bumpers, gas engine packing, fan belts, rubber matting, hard rubber radiator caps and steering wheels, bicycle grips and goggles, many of which were shown.

An exceptionally complete line of rubber accessories was shown by the Voorhees Rubber Manufacturing Co., Jersey City, New Jersey. Of principal interest were the "Ideal" (red) and "Model" (gray) laminated tubes for automobiles and motorcycles. In addition to reliners, inner sleeves, boots, patches and all the customary materials for roadside repair, the firm deals in vulcanizing gums of all sorts, rebuilding fabrics and cements for the professional tire repairman, and also manufactures hose and tubing, fan belts, windshield packing, matting, sheet packing, bumpers, round springs, washers and rubber mallets.

Charles O. Tingley & Co., Rahway, New Jersey, offered a comprehensive line of sundries for automobile and cycle tire repair, featuring the C. O. T. Cement Cure Patches, Cure Tight Gum for tube blowouts, and String Repair Kit Plugs.

ELECTRICAL DEVICES.

The Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pennsylvania, manufacturers of motors for all purposes, presented automobile motor-generator sets for charging, lighting, starting and ignition.

The General Electric Co., Schenectady, New York, also offered generator lighting and starting systems, electric lamps, bulbs, rectifiers and other specialties.

Other exhibitors of lighting and starting systems included the A. B. C. Starter Co., Detroit, Michigan; Bosch Magneto Co., New York City; Disco Electric Starter Corporation, Detroit, Michigan; Gray & Davis, Inc., Boston, Massachusetts; the John Heinze Co., Springfield, Ohio; Kemco Electric Manufacturing Co., Cleveland, Ohio; Leece-Neville Co., Cleveland, Ohio; North East Electric Co., Rochester, New York; A. J. Picard & Co., New York City; United States Light & Heat Corporation, Niagara Falls, New York; Wagner Hoyt Electric Co., New York City; Ward-Leonard Electric Co., Mount Vernon, New York.

The Cutler-Hammer Manufacturing Co., Milwaukee, Wisconsin, well known for its electrical control devices used extensively in rubber factories, attracted favorable notice with the compact, efficient C-H Magnetic Gear Shift and small, rugged automobile lighting switches for dash and steering post.

The General Bakelite Co. of New York City made an interesting display of molded electrical insulation.

Storage batteries were displayed by the Detroit Battery Co., Detroit, Michigan; Dyneto Electric Co., Syracuse, New York; Electric Storage Battery Co., Philadelphia, Pennsylvania; Gould Storage Battery Co., New York City; Paul N. Marko, Brooklyn, New York; Philadelphia Storage Battery Co., Philadelphia, Pennsylvania; Prest-O-Lite Co., Indianapolis, Indiana; United States Light & Heat Corporation, Niagara Falls, New York; Wagner-Hoyt Electric Co., New York City; Willard Storage Battery Co., Cleveland, Ohio.

Ignition devices for gasoline engines of every sort are manufactured by the following firms which were numbered among the exhibitors: Bosch Magneto Co., New York City; Ericsson Manufacturing Co., Buffalo, New York; Emil Grossman Manufacturing Co., Brooklyn, New York; The John O. Heinze Co., Springfield, Ohio; Heinze Electric Co., Lowell, Massachusetts; Herz & Co., New York City; Kent Manufacturing Works, Atwater, Philadelphia, Pennsylvania; K. W. Ignition Co., Cleveland, Ohio; Mosier & Co., Mount Vernon, New York; New York Coil Co., New York City; Splitdorf Electrical Co., Newark, New Jersey.

MISCELLANEOUS ACCESSORIES.

Charles E. Miller, New York City, with 15 stores in nine states, offered its complete line of sundries for motor-cars, motor-boats, motorcycles and motor-planes, among which were pneumatic tires and tubes of leading makes, repair materials and devices, together

with many varied tire and other rubber accessories, including the Twombly foot pump, which indeed "makes hard work a pleasure." The Vul-car, said to be the only alcohol-burning, portable vulcanizer for roadside repairs that protects the rubber with moisture so it cannot burn, was also of interest.

The silent chain employed in connection with the electrical equipment of rubber factories also supplies the "front end drive" of many automobiles, as exhibited in its latest improved form by the Morse Chain Co., Ithaca, New York.

A. Schrader's Son, Inc., Brooklyn, New York, offered the well-known "Universal" line of tire valves and accessories, in connection with which a unique circular was distributed. It had the appearance of an inter-line coupon railway ticket, as long as a man's arm, divided into eight detachable portions, one bearing the legend, "A Joy Ride to Contentment via A. Schrader's Son, Inc., Air Line," and each of the others bearing a cut and description of one of the "Universal" devices together with bright headlines in railway parlance.

The Raybestos Co., Bridgeport, Connecticut, showed its well-known brake linings and also demonstrated Royal brakes.

The Invincible Tire Tester, manufactured by the United States Gauge Co., New York City, in the shape of a watch, not only records the actual air pressure, but shows the proper pressure to be maintained in tires of various sizes.

Adams & Findley, New York City, offered the Rives Adjustable Neverslip Pedal Pads for greater safety in driving.

The Mattson Rubber Co., Lodi, New Jersey, showed the Mattson Slip-On Pedal Pads, readily adjustable in a few minutes and no metals to attach.

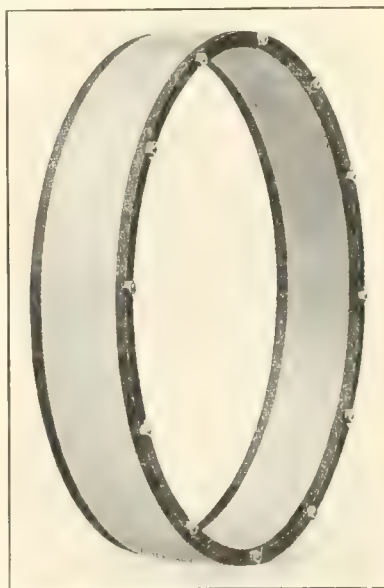
In connection with the Hoskyns Universal All-Weather Top for Ford Cars, displayed by the Universal Motor Products Co., Indianapolis, Indiana, rubber weather strips are ingeniously used to keep out drafts and eliminate noise.

The Metal Specialties Co., Chicago, Illinois, had a varied line of accessories and parts, including a few rubber goods.

THE BILTMORE SHOW.

The Miller Rubber Co., Akron, Ohio, displayed its large and varied line of rubber goods, featuring the new Miller "geared to the road" black-tread tire, red and gray tubes, and miscellaneous

tire accessories and repair materials, including retread bands, vulcanizing cement, Pluggum and the Shurtite tube repair kit, self-vulcanizing. An air bag for vulcanizing casings was shown and considerable interest was manifested in the Miller Demountable Cushion Pad, a shock-absorbing device for truck tires. It comprises a flat ring to be placed between the wooden felly of the wheel and the steel base of the solid rubber tire, consisting of a single strip of soft but tough resilient rubber $\frac{3}{8}$ inch thick with steel flanges on each side held in place by bolts let through



MILLER DEMOUNTABLE CUSHION PAD
FOR TRUCK TIRES.

the rubber from side to side at regular intervals. Many attractive circulars in English and Spanish were distributed, including a few devoted to balloons and toy novelties and druggists' sundries, also a convenient vest-pocket tire mileage record.

Tires and inner tubes were shown by the Norwalk Tire & Rubber Co., Norwalk, Connecticut.

In the space occupied by the H. W. Johns-Manville Co., New York City, were seen the well-known J-M Non-Burn Asbestos brake lining, fire extinguisher, Soot-Proof spark plug and speedometers.

S. A. E. ANNUAL MEETING.

THE attendance at the annual meeting of the Society of Automobile Engineers, held January 11, during Automobile Show Week in the Engineering Societies Building, New York City, exceeded all previous years, partly because of the interesting papers announced, but chiefly because of the broader present scope of the society, which now includes the designers of all forms of self-propelled vehicles and boats, including the airplane and tractor. The new members for 1916 number 338, bringing the total membership up to 2,121.

Perhaps the most important action at the meeting was the acceptance of the proposal to change the name to "The Society of Automotive Engineers," which will now be put to a vote by mail.

The following officers were elected for the ensuing year: George W. Dunham, president; Jesse G. Vincent, first vice-president; Charles M. Manly, second vice-president; Herbert Chase, treasurer; Benjamin B. Bachman, Harry L. Horning and Charles W. McKinley, members of the council for two years; Frederick E. Moskovics, member for one year.

All the Standards Committee reports were approved with little or no opposition except that of the Committee on Tires and Rims relative to truck tires, including the following proposed standard table for the carrying capacities of solid rubber tires:

Nominal width of tires	Gross load per wheel in pounds.	
	Tire diameter 36 inches and under	Tire diameter 40 inches and over
3 inches	1,000	.....
3½ inches	1,300	.....
4 inches	1,700	.....
5 inches	2,500	2,600
6 inches	3,300	3,500
7 inches	4,000	4,500

The tolerance allowed was considered too generous by several members and this section was therefore referred to the Truck Standards Division for further study.

THE S. A. E. BANQUET.

Over 800 members gathered at the Hotel Biltmore on the evening of January 11 for the annual banquet which was the greatest similar event in its history. Judge Charles F. Moore was toastmaster and the speakers included Russell Huff, past president of the society, who reviewed S. A. E. accomplishments of the past year, and Howard E. Coffin, chairman of the Industrial Preparedness Committee of the Naval Consulting Board, whose subject was preparedness as affecting automobile manufacturers.

The principal speaker of the evening, however, was Hon. John Barrett, director-general of the Pan-American Union, who discussed "Pan-Americanism" and what it means to manufacturers of automobiles and their accessories. After sketching briefly the facilities afforded by the Pan-American Union to those wishing to enter the South American market—the only one now freely open to American manufacturers—he presented several significant facts no less important to manufacturers of tires than of automobiles. Said he:

South America's economic evolution will be accomplished in direct proportion to its use of automobiles. Except for Argentina, the growth of population in South American countries and the operation of their industries depend on good roads and automobiles. If 100,000 miles of good roads could be built in South America an unbelievably large market for American cars would be created.

Mr. Barrett then explained that in South America it is cheaper to build a highway that will stand automobile traffic than to build railroads that would furnish even a part of the service that the motor highway would afford. But development in South America is dependent almost entirely upon the facilities for securing loans to finance improvements, and he made a plea for automobile manufacturers to impress upon their bankers that the sale of automobiles and accessories below the equator can best be promoted by providing American dollars or equivalent credit. Fifty million dollars of surplus profits loaned to South America, he said, would return 50 per cent profit and aid the automobile industry to a degree that could not be estimated in figures.

THE MOTOR AND ACCESSORY MANUFACTURERS.

At the recent annual meeting of the board of directors of the Motor and Accessory Manufacturers the following officers were elected for the ensuing year: C. W. Stiger, president; Charles E. Thompson, first vice-president; E. H. Broadwell (vice-president of The Fisk Rubber Co., Chicopee Falls, Massachusetts), second vice-president; T. J. Wenzel, third vice-president; L. M. Wainwright, treasurer; Alfred P. Sloan, secretary and assistant treasurer.

The present board of directors consists of: C. W. Stiger, C. E. Thompson, T. J. Wenzel, E. H. Broadwell, L. M. Wainwright, Alfred P. Sloan, Jr., James H. Foster, E. W. Beach, Christian Girl, W. O. Rutherford, William C. Rands, William M. Sweet and L. M. Bradley.

The board of directors has agreed to sanction the exhibit in a body of a goodly number of members at the first Pan-American Aeronautic Exposition, to be held in the Grand Central Palace, New York City, February 8 to 15.

The annual banquet, accompanied by music and vaudeville, was held the evening of January 10 at the Waldorf-Astoria and pronounced an unqualified success, about 600 being in attendance. As usual, there was no speechmaking.

FIRST PAN-AMERICAN AERONAUTIC EXPOSITION.

The manufacture of aeroplanes has ceased to be a mere "game." It is now counted as one of our great American industries, and the importance and significance of the first Pan-American Aeronautical Exposition, to be held in the Grand Central Palace, February 8 to 15, can hardly be overestimated. Manufacturers of rubberized fabrics and miscellaneous accessories containing rubber will be numbered among the exhibitors, many of them members of The Motor and Accessory Manufacturers, whose coöperation and standardized products promise to make bulk production a feature as vital to the continued growth of this industry as it has been to the building of automobiles. The United States Government will also have an elaborate exhibit.

A few salient facts describe the meteoric growth of this new industry. Two aeroplane companies in America are now capitalized at over \$10,000,000, and 14 factories in this country employ over 10,000 men. Aeroplanes to the value of \$30,000,000 were built in the United States last year, and this year's business is estimated at \$50,000,000. The United States Government alone has appropriated \$35,000,000 for the purchase of aeroplanes for the Army, Navy and Post Office Departments.

The war has demonstrated the value of the aeroplane as an instrument of defense and developed its highly specialized construction for scout work, battle and transportation. In the latter field machines capable of lifting 15 tons and flying at a speed of 125 miles an hour have become a practical accomplishment. As a result of the war large numbers of men have trained for flying. There are about 1,000 aviators in America; France has over 5,000 and England over 40,000, while the total Royal Flying Corps of England is said to number over 40,000.

What the Rubber Chemists Are Doing.

VULCANIZATION TESTS.

EATON and Grantham's recent paper on "Variability of Plantation Rubber in Technical Mixings," abstracted in THE INDIA RUBBER WORLD last month, is discussed by Doctor H. P. Stevens in the "Journal of the Society of Chemical Industry" (November 30, 1916).

Doctor Stevens states that he is in general agreement with Eaton and Grantham as to the effect of introducing mineral matter or reducing the proportion of sulphur. The result is that the introduction of a few per cent of litharge almost obliterates the difference in the rate of cure between the fast and slow curing rubbers. The importance of litharge as an ingredient of technical mixings cannot be over-rated; possibly more than half the rubber goods manufactured contain litharge, and that is why some manufacturers use a mixing containing litharge for testing purposes.

Eaton and Grantham attribute the effect of litharge entirely to its action as an accelerator, but if this explanation were sufficient, magnesia should produce a similar effect. A better explanation is found in Doctor Stevens' research on the function of litharge in vulcanization [Journal of the Society of Chemical Industry, May 31, 1915, and THE INDIA RUBBER WORLD, August 1, 1915]. The conclusions there reached were: (a) That the addition of litharge in moderate quantities increases the coefficient of vulcanization; (b) that the maximum coefficient of vulcanization is obtained where there is just sufficient sulphur to cure the rubber fully and to convert all the litharge to lead sulphide and sulphate; (c) that increasing proportions of litharge cause a progressive reduction in the coefficient of vulcanization, a larger percentage of lead sulphide and sulphate being formed; (d) that the percentage of free sulphur drops suddenly at the point where the rubber is fully cured; (e) that even with large proportions of litharge a little free sulphur always remains.

If a simple relationship between the "optimum" cure and the correct cure be required *merely as a working hypothesis*, Doctor Stevens suggests that a geometrical relationship be adopted and to calculate the correct cure of the second sample by multiplying by the correct cure of the first and dividing by the "optimum" cure of the first.

IMPERIAL INSTITUTE VULCANIZATION TESTS.

Further investigations have been made at the Imperial Institute, London, on samples prepared in Ceylon by L. E. Campbell to determine the influence of various factors on the vulcanizing and mechanical properties of rubber. The subject is treated in full in the Department of Agriculture Bulletin, Ceylon, No. 24.

The following summary of these investigations is from "The India Rubber Journal" (December 2, 1916) and deals with the following:

(1) The effect of the form of the rubber, sheet, crêpe and block; (2) the effect of drying in air at ordinary temperature, in hot air and in a vacuum drier; (3) the effect of over-working the freshly coagulated rubber. Incidentally, comparison of rubber coagulated with acetic and hydrofluoric acid showed the former usually had the shorter time of vulcanization.

SUMMARY OF RESULTS.

The results recorded in this summary confirm those previously obtained in showing that plantation Para rubber is quite satisfactory in mechanical properties, the average tensile strength being fully equal to that of specimens of the best hard Para and the average elongation at the breaking point, only very slightly lower.

The chief variation is in the time required for correct vulcanization. There is no doubt from the results now available that

the conversion of the freshly coagulated rubber into crêpe lengthens the time of vulcanization, as compared with that of the corresponding sheet. In eleven comparative sets of specimens dealt with in this summary, the thin crêpe rubber had a distinctly longer time of vulcanization than the sheet, the figures ranging from 105 to 130 minutes for the crêpe and from 60 to 75 minutes for the sheet. It is noteworthy, too, that this lengthening of the time of vulcanization is brought about by passing the rubber through the rollers only five or seven times, and that additional treatment in the machine, up to 70 times through the rollers, has little further effect on the time of vulcanization. Thus the times of vulcanization of crêpe rubber passed through the rollers 7, 35, and 70 times were 113, 115 and 130 minutes, and the times for rubber treated 5, 25 and 50 times were 105, 115 and 115 minutes, respectively. The time for the control sheet was 75 minutes in each case.

Although the conversion of freshly coagulated rubber into crêpe has this marked effect on the time of vulcanization, the tensile strength is again shown to be but little affected, the difference in the breaking load of the sheet and crêpe being small. In the specimens previously dealt with the advantage in average tensile strength was invariably in favor of the sheet, but the crêpe may have the higher value, as is the case in four of the six sets of specimens.

The "over-working" of the freshly coagulated rubber in the washing machine had little effect on the tensile strength, or on the time of vulcanization. Rubber passed through the rollers 50 or 70 times differed only slightly in either of these respects from rubber treated five or seven times. The common opinion that the mechanical properties may be easily impaired by "over-working," does not receive support from the results of these experiments.

The conversion of thin crêpe into thick crêpe, by rolling several pieces together, did not produce any difference in the time of vulcanization, and the differences in tensile strength were not very marked or constant. The block rubber, made by compressing thin crêpe, had the same time of vulcanization as the latter, but in five out of six sets of specimens its tensile strength was a little lower.

The different methods of drying employed: (1) Air drying at the ordinary temperature; (2) drying in hot air; and (3) in vacuo, had very little effect on the time of vulcanization or tensile strength of the rubber.

RELATIONSHIP OF MECHANICAL TO CHEMICAL PROPERTIES.

Doctor D. Spence in "The India Rubber Journal" writes as follows on the relationship of mechanical to chemical properties of vulcanized rubber:

From experiments made there is no question that the combined sulphur at "optimum" cure in the case of *Hevea* plantation rubber is a remarkably constant quantity, equal on the average to approximately 2.8-3 per cent. Where more than this amount of combined sulphur has been found, either the method of vulcanization is at fault or the means of determining the "optimum" cure are inaccurate. In this connection it is necessary to point out that in the case of very soft, low-grade rubbers it is difficult to judge of the "optimum" cure, and there is always the tendency to increase the cure to beyond the "optimum" point in the hope of thereby improving the physical or tensile properties of the product. In the case of any good grade of *Hevea* plantation rubber there is no such difficulty, however, and where more than 2.8-3 per cent of combined sulphur is reported in this case, either the sample is over-cured, or what amounts to the same thing, vulcanization has not been properly carried out. With proper methods of vulcanization, and with the requisite experience in the judging of the proper cure, the combined sulphur at "op-

imum" cure should never greatly exceed the figures we have given. It should be pointed out, however, that if the time of cure required to produce the "optimum" result is extended, the chances are an increase in the amount of the combined sulphur at the "optimum" point over the figures we have given will be found; depolymerization, requiring an increase in cure to bring the rubber up to apparent physical "optimum" leads to an increase in the combined sulphur considerably over the amount which we have given. The rubber in this case is nevertheless over-cured, and where the vulcanization of the rubber is carried out scientifically, in a minimum of time, and with the least possible injury to the molecule, the combined sulphur at "optimum" cure will never be found to exceed 3 per cent.

Whether these figures obtain for rubbers of different botanical origin or not we have not sufficient analytical evidence at present to say. The constancy of this result is deduced from experiments made on *Hevea Brasiliensis* rubber only. The relation between the rubber and combined sulphur at correct cure is so constant that it is regarded as representing a more or less definite compound of rubber and sulphur to which a formula may be assigned on the assumption that partial valencies of the rubber aggregate have not all the same affinity for sulphur.

It may be of interest to record the fact that we have observed that the point at which the physical properties of pure balata on vulcanization suddenly change to more nearly resemble those of rubber, corresponds very closely with a combined sulphur content of 3 per cent. If pure balata is mixed with a little sulphur and a suitable catalyst, which is essential to its proper vulcanization, it will be found that when about 3 per cent of sulphur has combined with the balata, the physical properties of the vulcanized balata change from those of a hard inelastic product, more like hard rubber, to a pliant, semi-elastic product, more nearly resembling soft vulcanized india rubber. This phenomenon is exceedingly remarkable and interesting, as the transition point in the physical characteristics of balata on vulcanization occurs at about the same degree of chemical vulcanization as corresponds to the "optimum" cure of vulcanized india rubber. This has given rise to a number of experiments by us, with a view to converting balata into rubber and vice versa, some of which have led to exceedingly interesting results.

METHODS OF ANALYSIS.

EXAMINATION OF VULCANIZED RUBBER GOODS.

THE following methods are standard for the examination of vulcanized rubber goods as specified by the Board of Estimate and Apportionment of New York City.

The methods for free sulphur, mineral fillers, vulcanized rubber gum by weight, and vulcanized rubber gum by volume, have already been given in this department (August 1, 1915), and are here omitted.

PREPARATION OF SOFT RUBBER FOR ANALYSIS.

A sample of not less than 25 grains is made by taking pieces from various parts of the original sample. The backing of fire hose is buffed off before grinding; in all other hose separate samples of tube and cover are made without removing the backing or the friction compound. Other rubber goods containing frictioned fabric and rubber layers are ground up without removal of the adhering friction.

The sample is cut into small pieces and run through the grinder, taking for analysis only such material as will pass a 20-mesh sieve. The grinder should not become appreciably warm during the grinding. If the material gums together and cannot be sieved, it is simply passed twice through the grinder and all the material taken for the final sample. Crude rubber is cut with scissors.

A strong magnet is passed through the sample to remove any metal from the grinder and the thoroughly mixed sample is put

in tightly-stoppered bottles and kept not exposed to sunlight or heat.

Hard rubber is prepared for analysis by rasping.

ACETONE EXTRACTION.

Place a two-gram sample, which has been ground not more than 24 hours before, in an acetone-extracted paper thimble, and insert in a glass syphon cup under a condenser. Dry and weigh a clean 8 by 1¼-inch test tube, weighing between 20 and 40 grams, by means of a wire loop; pour in 50 cc. acetone, connect the apparatus, and extract continuously for 8 hours in such manner that the drops of condensed solvent will fall directly on the ground rubber; that the syphon cups will fill in 2½ to 3½ minutes; that the discharge of the syphon cup will not appreciably interrupt the boiling; that the condensed solvent will filter rapidly through the paper thimble, and that no fine particles of rubber or fillers will be carried over. If the solution in the cup is colored after eight hours' extraction, the extraction is continued for four hours the next day. Evaporate the acetone from the tube in a slanting position over live steam, wipe off the outside with a clean linen cloth, and dry to constant weight in a water oven at 95 to 100 degrees C., or until the weight increases, cooling in a desiccator. Calculate and record as "total acetone extract."

ORGANIC ACETONE EXTRACT.

When waxy hydrocarbons are not to be determined, subtract the percentage of free sulphur from the percentage of total acetone extract above, and record the difference as "organic acetone extract."

TOTAL SULPHUR.

A half-gram sample with six grams of potassium carbonate and four grams of sodium peroxide are mixed by rotating in a crucible; cover, heat at a low temperature over an asbestos shield to avoid sulphur fumes, until the mixture fuses, then bring to quiet fusion for 15 to 20 minutes. Avoid rapid heating and explosions. Rotate the melt while solidifying. When cool, put crucible and cover into a casserole containing 200 cc. of water, add five to ten cc. of bromine, and boil until the melt is dissolved. Allow to settle, decant, filter and wash through a thick filter with hot water. Acidify the filtrate with hydrochloric acid, using Congo red paper, make up the volume to 400 cc., and precipitate, boiling with 10 cc. of a 10 per cent solution of barium chloride, keeping the beaker covered with a watch glass. Allow the precipitate to stand over night, filter on an asbestos mat in a Gooch crucible, wash with hot water, ignite, and weigh, cooling in a desiccator. Calculate to sulphur (factor 0.1372) and record as "total sulphur."

OILY FOREIGN MATTER.

Where the presence of tar, pitch or asphalt is not indicated, spread out the rubber residue from the acetone extraction and dry in the water bath at 95 to 100 degrees C. until the odor of acetone is no longer apparent. Transfer to a 100 cc. pressure flask fitted with washers previously extracted with alcoholic potash. Add 50 cc. of alcoholic potash, stopper and heat in an air oven kept between 105 and 110 degrees C., for four hours. Cool the flask, filter and wash the residue with hot absolute alcohol until the washings are no longer colored. Make the filtrate strongly acid with concentrated hydrochloric acid to precipitate potassium chloride, allow to settle, filter and wash with hot chloroform into a small casserole. Place the casserole on the steam bath and evaporate until the odor of hydrochloric acid just disappears. Take up the residue with chloroform, filter and wash with hot chloroform into a weighed beaker, evaporate the chloroform on the steam bath and dry the residue in the water oven at 95 to 100 degrees C., in 15-minute periods, until the weight is constant, or increases, cooling in a desiccator. If the residue is not oily to the touch no report shall be made. If the residue is oily to the touch, subtract 2 per cent of the weight of vulcanized rubber gum, as determined below, from the cal-

calated amount found, and record the balance as "oily foreign matter."

TARRY FOREIGN MATTER.

If the compound is light in color, tar, pitch and asphalt shall be considered absent. If the compound is dark or black in color the residue after the acetone extract determination above, without removing the acetone, and before the alcoholic potash is made, is extracted with chloroform for four hours in the same manner and by the same procedure as for the acetone extraction. If the extract is very dark in color, or the residue is tarry, from its calculated amount shall be subtracted 3 per cent of the weight of vulcanized rubber gum, as determined below, and the balance recorded as "tarry foreign matter."

PRECAUTIONS.

When the chloroform extraction is made the day after the acetone extraction, the rubber residue shall be covered with acetone over night. When the alcoholic potash extraction is made the day after either the acetone extraction or the chloroform extraction, the dried rubber residue shall be covered with the alcoholic potash over night.

CARBONACEOUS FOREIGN MATTER.

Heat about one gram sample with 30 cc. of concentrated nitric acid and 15 cc. water. A black insoluble residue indicates the presence of carbon, as lampblack, graphite, etc. Examine the ground rubber under the microscope and observe the residue of fillers in the mineral fillers determination. If fibers or carbon are seen, except as a trace, proceed as follows:

The crucible containing the fillers is washed with hot dilute hydrochloric acid and hot water to decompose carbonates and sulphides, dried to constant weight at 105 to 110 degrees C., desiccating until cool. The crucible is then ignited to constant weight and the loss calculated and recorded as "carbonaceous foreign matter," and shall be subtracted from the percentage of "mineral fillers" recorded above.

SPECIFIC GRAVITY.

Make the determination on a strip or strips not less than five grams weight. Weigh to one milligram in air, then, thoroughly wet with water, pressing and squeezing, with the fingers under water, to remove bubbles or films of air. Weigh to one milligram in water at 20 degrees C. (taken as 1.00), calculate to 0.001 and record as "specific gravity."

RATIOS.

Free sulphur and organic acetone extract are separately calculated and recorded as percentages by weight of vulcanized rubber gum present.

CHEMICAL PATENTS

THE UNITED STATES.

PHENOLIC CONDENSATION PRODUCT. A coating composition containing a phenolic condensation product and a cellulose ester, in conjunction with tetrachlorethane. [Whitney B. Jones, Perth Amboy, New Jersey, assignor to General Bakelite Co., New York City. United States patent No. 1,209,165.]

DENTAL RUBBER COMPOSITION. Dental plates made of finely ground vulcanized rubber compounded with raw rubber. The object is to neutralize the expansion of the one by the other during vulcanization. [S. G. Supplee and C. J. R. Engstrom. United States patent No. 1,204,609.]

THE UNITED KINGDOM.

VULCANIZATION AGENT. Nitrosophenols or their homologues, such as nitrosocresols or nitrosoxylenols, are used for facilitating the vulcanization of natural or artificial caoutchouc or caoutchouc-like substances. In an example, ten parts of sulphur and one part of nitrosophenol are used for vulcanizing 100 parts of rubber at a temperature of 135-145 degrees C. [S. J. Peachey,

Priestnall Road, Heaton Mersey, England. British patent No. 101,819.]

CEMENTING EBONITE. Parts of ebonite articles are cemented together by means of a solution of celluloid in amylacetate or other solvent. [C. A. Vandervell, Warple Way, Acton Vale, Middlesex, England. British patent No. 12,075 (1915).]

FIBROUS SHEET. Sheet material from fibers arranged substantially parallel is impregnated by a binding material; impregnation done in a vacuum. Multiple-ply stock, with cross layers of fibers, may be made from such material; and in that state is applicable to the manufacture of tires, hose, matting, belting, covers, heels and soles. [Rubber Regenerating Co., New York City. British patent No. 101,318.]

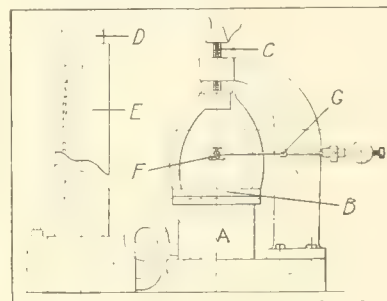
SWITZERLAND.

ELASTIC PRODUCT. A composition of gas tar, rubber, ordinary cement and mineral filling. The gas tar minus some of its oil is mixed with rubber dissolved in a solvent composed of benzene and carbon disulphide. This mass is liquified by heat, and cement and mineral filling added. The resulting mass is mixed and molded hot. [C. A. C. de Caudenberg. Swiss patent No. 73260, (Sept. 16, 1916).]

LABORATORY APPARATUS.

INSTRUMENT FOR MEASURING WATERPROOFING EFFECT ON FABRICS.

An instrument recently invented for measuring the impermeability of waterproofing on cloth has been described in the "Journal of the Society of Dyers and Colorists." The method



of measurement is based on the determination of the number of hammer strokes upon the cloth before the water percolates through, the cloth being pressed upwards by a column of water. The instrument consists of a copper cylindrical box A on the top of which is fixed by a ring, B, tightened with a screw C, the cloth to be tested. The pressure of water against the cloth is regulated by the movement of the wooden cylinder D in the glass reservoir E, on which the height of the water is marked in centimeters.

When the water is five centimeters high the hammer F is dropped. The hammer has a weight of three grams, which may be increased by a movable weight G. After the first stroke the water is raised one centimeter, and after every subsequent stroke it is raised again. The number of strokes required before the water appears on the surface of the cloth shows the degree of impermeability.

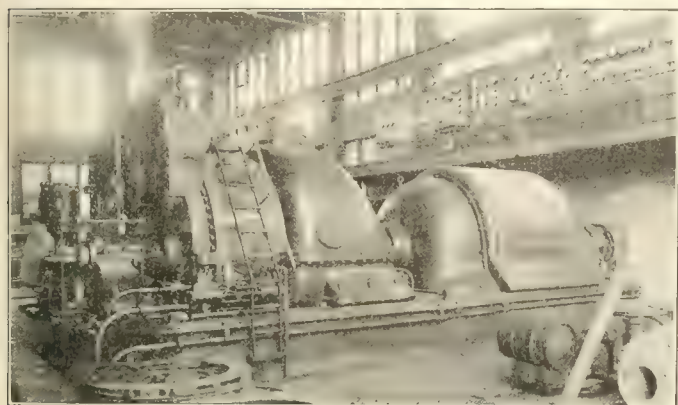
SULPHURIC ACID IN 1916.

Market conditions throughout the country are reported to have been on the whole better than in 1915, despite the somewhat higher value of the product. Reclaimers of rubber will be interested to know that according to reliable estimates by the United States Geological Survey the output of acids of strengths of 60 and 66 degrees amounted to nearly 950,000 tons, or practically the same as in 1915. The total estimated production of sulphuric acid, however, of strengths of 50, 60 and 66 degrees was 4,475,000 tons as expressed in terms of 50-degree acid, representing an increase of 600,000 tons or more than 15 per cent. The most notable feature in the sulphuric acid industry was the enormous increase in the production of acids of strengths greater than 66 degrees. The estimate shows a production of over a million tons as against less than 200,000 tons in 1915.

New Machines and Appliances.

A RUBBER MILL STEAM TURBINE.

THE reciprocating steam engine as a factor in the production of power for industrial purposes is now generally conceded to be almost negligible. True, there is occasionally found in modern plants that well-known type of reciprocating engine, the Corliss, which has dominated the field for many years.

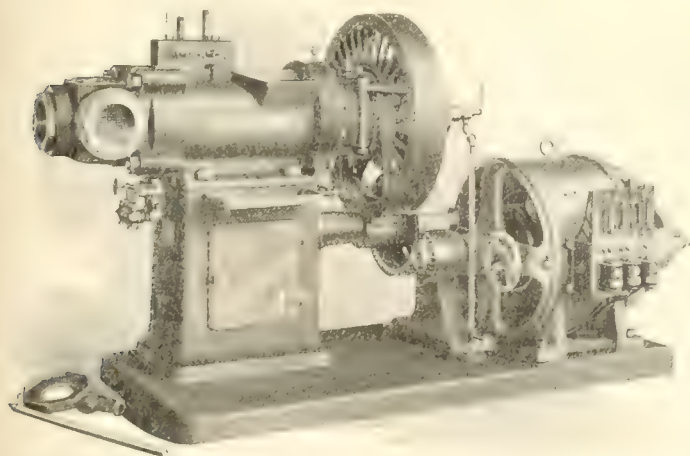


Moreover, in modern practice its use is more or less sentimental and rather impractical, for the steam turbine has long ago proved its superiority in the production of power.

The engineering executives of the large rubber factories have not failed to appreciate the many advantages of the modern steam turbine, and several installations have been made in the larger mills. The accompanying illustration shows a steam turbine and generator in operation in the plant of the Firestone Tire & Rubber Co., Akron, Ohio. This turbine has a maximum capacity of 10,000 kilowatts [13,333 horse power]; the steam consumption is approximately 14 pounds per kilowatt, through a range of $\frac{3}{4}$ load to $1\frac{1}{4}$ load. The turbine is operating on 175 pounds steam pressure, 50 degrees superheat, and exhausting into a surface condenser under $28\frac{1}{2}$ -inch vacuum, and generating at 2,200 volts. The air for generator is passed through a modern type of air washer, thus giving very much lower temperature rise on the generator. [The General Electric Co., Schenectady, New York.]

A NEW THREE-WAY DELIVERY HEAD STRAINING MACHINE.

In reclaiming devulcanized rubber and the preparation of new rubber, particles of fiber, metal and other impurities are re-



moved by a mechanical straining process. Where large capacity that requires continuous, high-speed operation is desired the

three-way delivery type of straining machine is recommended.

The illustration is that of a 6-inch, self-contained strainer, equipped with motor-drive, automatic self-starter and stock-worm cooling device. It is built in accordance with the well-known excellence of design, material and workmanship characteristic of all Royle products.

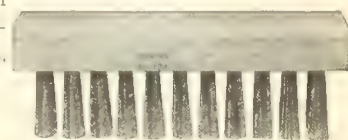
The large straining area provided in this multiple head and the simplified straining parts that may be quickly interchanged are salient features in securing a maximum production. No less important is this specially constructed stock-worm and hopper proportionately designed to handle large quantities of material without clogging the machine.

To insure perfect alignment and efficient operation of the rapidly moving parts, the machine, out-board bearing and motor are mounted on a continuous bed-plate of substantial construction.

Rubber compounds vary in composition, requiring different stock-worm speeds in order that the maximum straining capacity may be attained at all times. This is obtained by a standard form of variable speed motor drive that is shown in the illustration. [John Royle & Sons, Paterson, New Jersey.]

HAND AND POWER BRUSHES FOR RUBBER WORKERS.

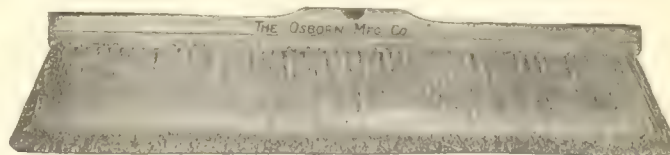
That brushes of various sorts are used in the rubber mills is generally accepted as a fact of comparatively minor importance. But upon investigating the subject it would appear from the variety of standard sorts in use, and the many types designed for special purposes,



that the brush problem in a rubber mill is by no means the least in importance.

There are, first, the hand brushes such as the counter, bench and floor brushes, that are made of good stock and in such a manner as to conserve their usefulness and not shed the bristles. Fine steel wire hand brushes with bristles of round tempered wire suitable for cleaning molds, cores and metal surfaces are made in accordance with the particular use for which they are intended.

Power brushes are of the rotary type and are principally used by tire manufacturers for roughening the casings before cementing and applying the tread. The bristles are of carbon steel wire and are made in sections which when worn out may be readily replaced. The complete wheels with brass or steel hubs are furnished in sizes varying from $6\frac{1}{2}$ to 15 inches in diameter and from $1\frac{1}{2}$ to 3-inch face. Of this type are the special rotary steel



brushes operated on a buffing stand or flexible shaft drive for cleaning tire molds and cores. They are made in different sizes and shapes with bristles soft or stiff according to the work required of them. Special rotaries are made as small as 3 inches and as large as 36 inches in diameter, with faces as wide as 6 inches.

The spreader brush is set up at the end of a spreading machine and is driven by chain gearing from the main drive. Its province is to dust the starch from the rubberized fabric as it passes

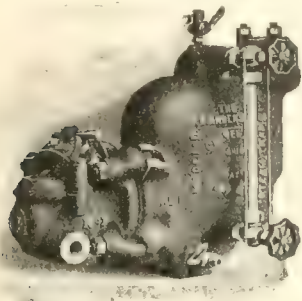


from the spreader to the wind-up roller. These brushes are made with soft bristles, about 8 inches in diameter and 48 to 70 inches long, depending on the width of the spreader.

There are, of course, other brushes that are included in the general list of factory supplies, but the foregoing types are of greater importance and therefore more interesting. [The Osborn Manufacturing Co., Cleveland, Ohio.]

THE ANDERSON FLOAT-TYPE STEAM TRAP.

The successful operation of vacuum chamber dryers, vacuum rotary dryers and fabric dryers used by rubber manufacturers and reclaimers for drying rubber and fabrics depends in great measure upon the efficiency of steam traps. A float trap, which has a greater capacity than is actually needed in order to take care of any variation, is usually specified. It is, moreover, advisable and almost necessary to have an individual trap on the steam line from each separate dryer; otherwise there will be back-pressure and the condensation will not drain properly. The heating element in vacuum chamber dryers, used in this country and abroad for drying rubber as it comes



from the washers, consists of hollow steel shelves. Steam passes into these shelves, and if any steam is condensed the water must be properly drained in order to make every square inch of the heating surface effective and to insure maximum and uniform drying of the rubber. The steam trap is placed underneath the dryer and connected with a special header that communicates with each of the shelves and drains any condensation that may collect.

Vacuum rotary dryers are used throughout the world for drying reclaimed rubber. They have a steam jacket in the outer shell, and concentric with a hollow revolving drum, also steam heated. A trap is provided for the steam jacket and a hollow shaft to remove the condensation.

Special fabric dryers are equipped with individual traps which operate in practically the same manner as those described in connection with vacuum chamber dryers.

The trap shown in the accompanying illustration is a typical float trap that is well and favorably known to the rubber trade. Its operation, briefly described, is as follows:

The condensed water enters the trap at the point marked "Inlet" and when sufficient accumulates to seal the valve with at least three or more inches of water, the float then raises and opens the valve, allowing the condensed water to escape at just the right rate to take care of the amount entering the trap, thus maintaining a water seal at all times.

After the trap has been in use a short time it is advisable, especially on new piping, to remove the sediment strainer and remove the accumulation of scale and chips.

The trap may be connected to several dryers with good results, provided a uniform steam pressure is maintained at all times. It is always advisable when making up a connection of

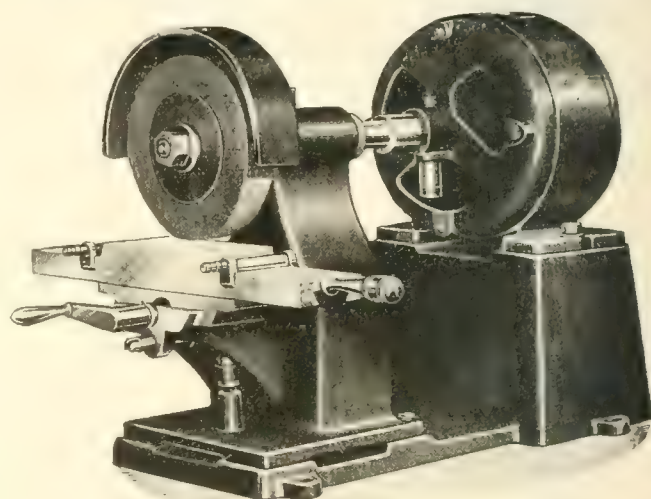
this kind to run the several drips into a large header and attach the trap to the header, which has the effect of equalizing the pressure to a certain degree and produces better results.

When the pressure varies to any extent in the dryers the one having the highest pressure will discharge freely and back up into those having a lower pressure, and the best results can be obtained only by attaching separate traps to those having lower pressure.

A very common trouble with steam traps is caused by low places or pockets in the piping system. Water accumulates in the low spots and is forced through into the trap at intervals, causing an uneven discharge. Where the quantity of accumulated water is sufficient and the steam valve in the line is opened suddenly this water is forced through the pipes at such a high velocity as to cause a water hammer which is very destructive to the whole piping system. [The V. D. Anderson Co., Cleveland, Ohio.]

MOTOR-DRIVEN TEST-PIECE GRINDER.

In making tensile strength tests of the rubber or fabric materials that are used in the construction of tires, hose, belting, etc., the sample should be absolutely uniform in cross section.



This is usually done on a small bench grinder with an abrasive wheel. The original machine of this type, designed primarily for grinding hose-lining test-pieces, was illustrated and described in THE INDIA RUBBER WORLD December 1, 1914.

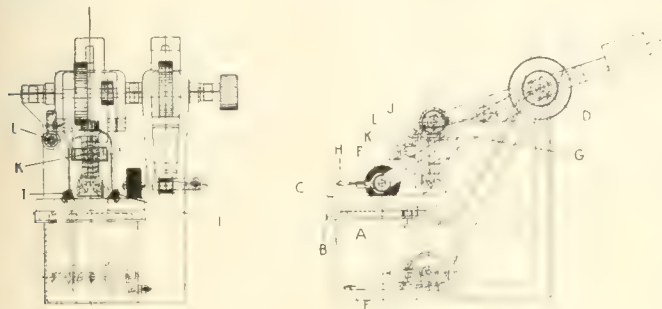
The latest machine, shown in the accompanying illustration, has been improved to meet the requirements of modern rubber laboratory practice. The machine is direct connected to a ¼-horse-power electric motor and mounted on a continuous bed plate. The ends of the test-piece are clamped by eccentric rollers that hold the strip firmly against the platen. The platen is provided with hand-operated screws for vertical and transverse adjustments. The test-piece is ground by moving the platen longitudinally under the revolving emery wheel by means of the projecting handle and it is moved transversely by the cross feed handle shown in the illustration. [Emerson Apparatus Co., Boston, Massachusetts.]

TIRE MOLD AND CORE CLEANING MACHINES.

The mechanical progress that is being made in tire building follows closely the increasing demand for greater production of automobile tires. The hand labor of yesterday is rapidly becoming eliminated by modern time-saving machinery. The old, laborious method of cleaning tire molds and cores by hand may be superseded by the ingenious machines here shown.

Referring to the drawing, the base *A* supports the table *B*, on which rests the mold *C* that is to be cleaned. The table

and mold are rotated by an internal gear and pinion driven by worm gearing from the main drive shaft *D*, and controlled by a friction clutch operated by the treadle *E*. The large rotary wire brush *F* revolves in the lower end of a swinging arm *G*, and is driven by a belt from the main drive shaft *D*. The brush is moved laterally to accommodate different sized molds by a hand lever *H*.

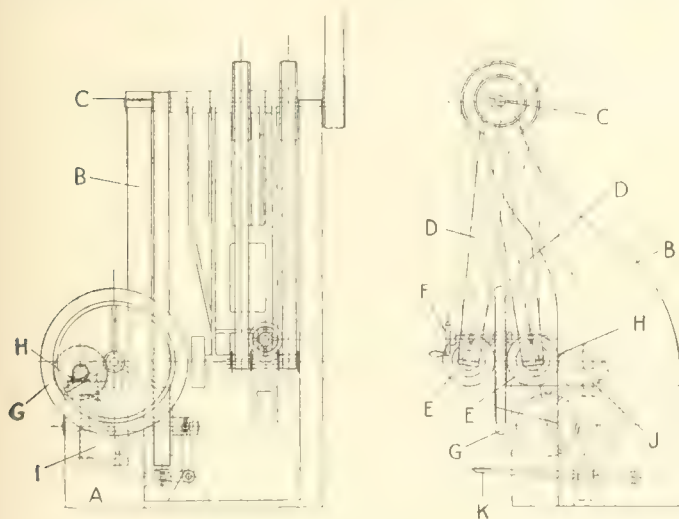


TIRE MOLD CLEANING MACHINE.

The two small brushes *I, I*, are supported on arms that swing around the vertical shaft *J*, the angle of the brushes being adjusted by hand-wheel *K*. Adjustments for different mold sizes are obtained by worm gearing operated by hand-wheel *L*. All the mechanism is fulcrumed on the main drive shaft *D* so that the large and small brushes may be raised when placing or removing a mold on the table.

The core cleaning machine is mounted on a base *A* provided with housings *B* that support the main shaft *C*, upon which are fulcrumed the swinging arms *D, D*. The two belt-driven, rotary wire brushes *E, E*, are journaled in the ends of the swinging arms, and are held in a central position by a bracket, and adjusted by a right and left hand screw operated by hand-wheel *F*.

The core *G* is mounted on a carriage *H* that is moved backward and forward by a face cam *I*; meanwhile the core is being rotated by worm gearing *J*. A friction clutch operated by treadle *K* controls the movement of the core and carriage, while the brushes run continuously. Instead of mounting the core on the spider,



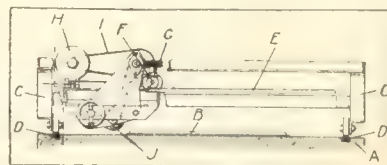
TIRE CORE CLEANING MACHINE.

two concave driving pulleys below, with one concave idler pulley above, may be utilized to drive the core, thereby avoiding the time necessary in chucking the core on the spider. Both mold and tire cleaning machines shown in the drawings are operated by belt-power. This, however, is optional, as motor drive may be installed with an additional cost that in most cases is deemed negligible. [R. W. Wheeler, Cleveland, Ohio.]

MACHINERY PATENTS.

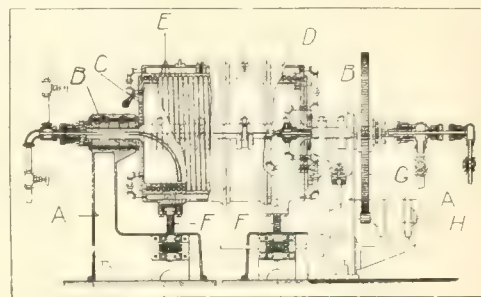
AN OVERFLOW TRIMMING MACHINE.

THE object of this machine is to remove the surplus material from rubber or composition heels, soles and similar molded articles while in the molds. It is here shown in side elevation, mounted on a table *A*, upon which are placed the molds *B*, containing the articles to be trimmed. The rectangular frame *C* is supported on rollers that travel on tracks *D*, permitting movement across the table of the frame on which the carriage is mounted. The carriage comprises two parallel racks *E* and pinions *F*, driven by worm gearing *G* from the electric motor *H* by means of belt *I*. The trimming roller *J* is journaled in pivoted bearings, and adjustable to increase or diminish the friction of the roller in the trimming operation, and also to compensate for different mold thicknesses. The roller is covered with rubber, or any suitable abrading material may be used. It is driven by a crossed belt from the motor countershaft, and as the carriage traverses the table, the roller revolving in the opposite direction removes the overflow. Upon successive shifts of the frame at each traverse of the carriage all the rows of molds may be successively trimmed. [Harry D. Garber, Stoughton, Massachusetts, assignor to Plymouth Rubber Co., Canton, Massachusetts. United States patent No. 1,208,944.]



MACHINE FOR VULCANIZING HOSE IN CONTINUOUS LENGTHS.

The drawing is a side elevation showing the machine partly in section, mounted on end frames *A, A* that support the bearings *B, B*, of the hollow drum *C*, which is surrounded by a cylindrical, chambered jacket *D*. The contacting cylindrical faces of both the drum and jacket are provided with spiral grooves *E*, forming a continuous mold cavity for receiving the hose to be vulcanized in continuous lengths.



The jacket *D* is formed in two half-sections that the upper one may be removed when the hose is placed on the drum or when being removed after vulcanization, the lower section of the jacket being supported in the meantime by two jack screws *F, F*. To effect uniform curing the drum and jacket are rotated by the large gear *G*, driven by the motor *H*, the jack screws being lowered during this operation.

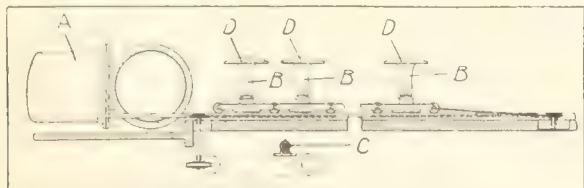
Connections for supplying steam to the interior of the drum and jacket are provided, also means for applying air under pressure within the hose during the vulcanizing operation. [Sarah D. Hewitt, Buffalo, New York. United States patent No. 1,210,938.]

A HORIZONTAL PRESS VULCANIZER.

The novelty in this vulcanizer as compared with the vertical type consists in accessibility of the operating parts and means for more quickly charging and discharging the tire molds. Moreover, the boltless molds are piped individually, permitting the use of inward or outward pressure in the vulcanizing process.

The drawing represents a side elevation of the apparatus, which consists of a horizontal heater *A*, and a train of press cars *B, B, B*, that are coupled together and moved in and out of the heater by an endless chain gearing driven by the motor *C*.

Each press car includes a platform mounted on flanged wheels, upon which the boltless tire molds are stacked. The under part of the platform is formed with a shallow cylinder of relatively

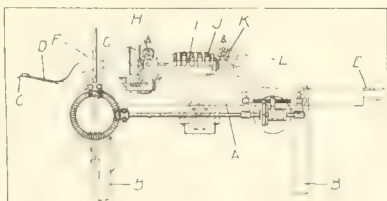


large diameter in which reciprocates a hydraulic ram. The mushroom-shaped press head *D* connects with the upper end of the ram by a screw joint so that it may be removed when the molds are being loaded or unloaded from the car.

In operation the press heads being removed, the molds are stacked on the cars and connected to the internal pressure supply line. The heads are then lowered, the stems traversing the interior of the mold stack, and screwed to the ends of the rams. Pressure is thus successively applied until the molds are completely closed, when the cars are run into the heater and pressure is applied to the interior of the tires. The vulcanizer head is then closed and the tires cured in open steam. [John R. Gammetér, Akron, Ohio, assignor to The B. F. Goodrich Co., a corporation of New York. United States patent No. 1,210,926.]

TUBE MAKING MACHINE.

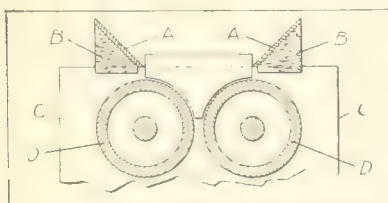
Inner tubes for tires or tubes for making rubber bands are made on this machine from a strip of uncured rubber sheet. The accompanying illustration, which is a side elevation of the machine partly in section, shows the frame *A* supported on suitable legs *B B*. The endless carrier belt *C* delivers the rubber strip *D* on to the machine and carries away the finished tube *E* at the back of the machine.



The tube forming strip is doubled and the edges are cemented by a device on the left not shown in the drawing. On entering the machine the strip is directed to a vertical plane by a guide *F* and then passed between vertical rollers *G*. On emerging, it is received between two horizontal rollers *H*, which flatten the strip in a horizontal plane with the cemented edges butted together. The tube then passes over a raised bed *I* and under four rapidly moving percussion hammers *J* which weld the edges of the tube together. Within the tube and directly under the hammers is a floating mandrel which separates the walls of the tube as it moves over the anvil. The tube then passes between the horizontal delivery rollers *K*, and deflected by idler roller *L*, it is removed from the machine by the carrier belt. [John R. Gammetér, Akron, Ohio, assignor to The B. F. Goodrich Co., a corporation of New York. United States patent No. 1,210,455.]

SAFETY GUARD FOR WASHERS AND MILLS.

This invention has for its object an improved guard especially applicable to grinders, mixers and washers and which will afford effectual means for preventing the hands of the operative being crushed



between the rolls without interfering with the feeding of the material.

Referring to the drawings, the guard comprises a member *A*, con-

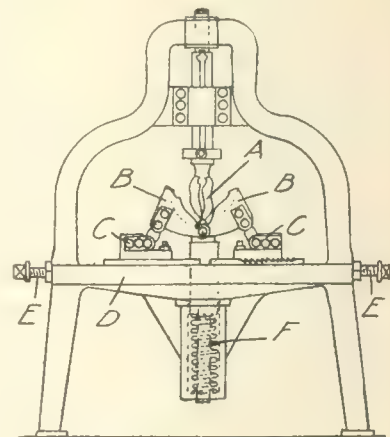
sisting of a length of wood, having attached to its ends triangular pieces *B*, whereby it is supported at an inclination on the side frames *C, C* in which the rolls *D, D* are mounted. Conveniently the triangular pieces *B, B* may be such that the member *A* lies at an inclination of about 45 degrees.

The two guards are arranged on the side frames *C, C* so that the members *A, A* incline outwardly with their lower edges approximately central of the rolls *D, D* and at an appropriate distance of about two inches, above the peripheries of the rolls. The spaces between the lower edges of the guards and the rolls are sufficient to permit the passage of a normal thickness of material under treatment. If the operator who is feeding the material to the rolls should pass his hands too far over the top of either roll, they will come into contact with the corresponding guard and his attention will thereby be called to the fact. [L. Gaisman and S. Dreyfus, both of Manchester, England, British patent No. 101,325.]

MACHINE FOR MOLDING HOLLOW RUBBER ARTICLES.

This machine forms hollow articles of rubber as doll bodies, rubber bulbs, etc. It is simple, easily adjustable, and can be controlled manually. By means of a hand lever attached to the vertical spindle the male die *A* can be raised or lowered. The two hinged portions forming the female die *B* are connected by toggle joints to the bases *C*, which are fastened to the lower platen *D* by set screws, or can be adjusted by screws *E*.

As the upper die is forced downward, the two segments of the lower die are forced together, and thus the article is shaped. As the upper die is released the lower one opens, due to the pressure of the spring *F*. The two dies can be changed very easily, and a variety of hollow objects may be produced. [Karl Jeffers, 44 Udestedtstrasse, Erfurt, Germany. German patent No. 638,713.]



OTHER MACHINERY PATENTS.

THE UNITED STATES.

- 1,208,777. Apparatus for making annular tubes. S. C. Hatfield, Baltimore, Md.
- 1,209,161. Fabric distorting device for tire building machines. H. J. Hoyt, assignor to Morgan & Wright—both of Detroit, Mich.
- 1,209,162. Vulcanizing apparatus. H. J. Hoyt, assignor to Morgan & Wright—both of Detroit, Mich.
- 1,209,202. Tire mold. H. Radovich, New York City.
- 1,209,308. Apparatus for molding objects by pressure. E. Lanhoff, Poissy, France.
- 1,209,536. Tire builder's tool. C. A. Arnold, assignor to The Hartford Rubber Works Co.—both of Hartford, Conn.
- 1,209,607. Mold for non-slip treads. I. H. Michelm, New Brunswick, assignor to Michelin Tire Co., Milltown—both in New Jersey.
- 1,209,671. Form for vulcanizing footwear. M. H. Clark, Hastings-Upon-Hudson, N. Y., assignor to Boston Rubber Shoe Co., Boston, Mass.
- 1,209,731. Footwear pressure cure apparatus for vulcanizing. C. Lee, assignor to The Goodyear's Metallic Rubber Shoe Co.—both of Naugatuck, Conn.
- 1,209,764. Pressure cure vulcanizing apparatus. E. W. Rutherford, Naugatuck, Conn., assignor to Boston Rubber Shoe Co., Boston, Mass.
- 1,209,779. Tire building apparatus. R. L. Taft, assignor to The Hartford Rubber Works Co.—both of Hartford, Conn.
- 1,209,903. Machine for constructing laminated cohesive interwound bands having varying limits of elasticity. L. A. Subers, East Cleveland, Ohio.
- 1,210,001. Wire-covering machine. F. S. Randall, Jersey City, assignor of one-third to I. L. C. Gooding, Summit, and one-third to C. V. Yates, Jersey City—both in New Jersey.

- 1,210,101. Pressure cure vulcanizing apparatus. C. J. Randall, assignor to The Goodyear's Metallic Rubber Shoe Co.—both of Naugatuck, Conn.
- 1,210,154. Process of and means for making tire liners. J. L. G. Dykes, Chicago, Ill.
- 1,210,420. Last molding apparatus. G. C. Clark, Mishawaka, Ind.
- 1,210,421. Last molding apparatus. G. C. Clark, Mishawaka, Ind.
- 1,210,902. Apparatus and method of manipulating and travelling rolls of fabric. E. B. Cederstrom, assignor to Morgan & Wright—both of Detroit, Mich.
- 1,211,256. Tire stripping machine. W. C. Stevens, assignor to the Firestone Tire & Rubber Co.—both of Akron, Ohio.
- 1,211,370. Extrusion machine. R. B. Price, New York City, and W. J. Steinle, Elmhurst Heights, N. Y., assignors to Rubber Regenerating Co., Mishawaka, Ind.
- 1,211,827. Tire winding machine. W. R. Denman, assignor to The Miller Rubber Co.—both of Akron, Ohio.
- 1,211,886. Convertible tire mold. H. J. Smith, New Castle, assignor of one-half to J. S. Wilson, Pittsburgh—both in Pennsylvania.
- 1,211,918. Tire building core. H. Z. Cobb, Winchester, Mass., assignor to United States Rubber Co., New Brunswick, N. J.
- 1,212,016. Dental vulcanizer attachment. T. T. Carter, Columbus, Kans.
- 1,212,207. Tire stitching machine. R. Griffith, assignor to The Miller Rubber Co.—both of Akron, Ohio.
- 1,212,457. Mechanical expansion mold. B. Darrow, assignor to The Goodyear Tire & Rubber Co.—both of Akron, Ohio.
- 1,212,643. Fabric coating, drying and solvent recovery apparatus. C. F. Hopewell, Newton, Mass.
- 1,212,725. Mold for vulcanized rubber dental plates. G. M. Wolpe, Indianapolis, Ind.

THE UNITED KINGDOM.

- 11,729 (1915). Plastic tires and apparatus for making them. I. A. Muscott and Rubberine, Limited, Campbourne Works, High street, Hornsey, London.
- 12,002 (1915). Latex coagulating apparatus. J. Schadt, Medan, Dutch East Indies.
- 12,128 (1915). Tire tread vulcanizer. E. Nall, Akron, Ohio.
- 12,356 (1915). Second core for tire molds. J. H. Coffey and J. H. Coffey, 73 Jameson avenue, Toronto, Ontario, Canada.

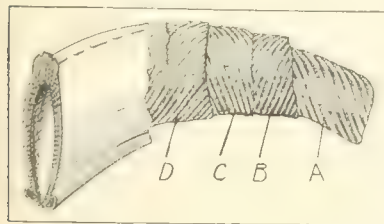
THE FRENCH REPUBLIC.

- 481,170 (March 13, 1916). Improvements in machines for cutting and handling strips of rubberized fabric. Firestone Tire & Rubber Co.
- 481,171 (March 13, 1916). Improvements in tables used in manufacturing inner tubes for pneumatic tires. Firestone Tire & Rubber Co.

PROCESS PATENTS.

THE MILLER CORD TIRE.

SEVERAL layers of rubber-impregnated cords are wound spirally around an annular core. The carcass is then slit on the inner circumference and removed to a second core on which the tire is completed. The process consists in first applying a coating of cement to the core upon which the cords of the first-ply *A* are wound at a definite angle. They are spaced apart at the tread portion and nearly in contact along the inner circumference of the core.



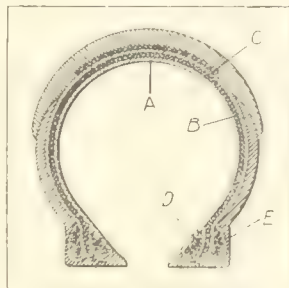
A coating of rubber is then applied to the first ply and a second cord ply *B*, is laid on the first at a reverse angle. This procedure is repeated until a structure is built up having four alternately superposed plies, *A*, *B*, *C*, *D*, of cords embedded in rubber and arranged at reverse angles in respect to one another. The carcass is then slit and placed on a core where the tire is finished and subsequently placed in a mold and vulcanized under pressure. [Walter R. Denman, assignor to Miller Rubber Co.—both of Akron, Ohio. United States patent No. 1,210,434.]

MOLDING FOUNTAIN PEN BARRELS. A tube of unvulcanized rubber of the desired size and shape, containing a small quantity of water, is closed at each end by plugs of raw rubber. The tube is then inserted in a mold which is placed in a vulcanizer and the tube vulcanized in the usual manner. The heat converts the water within the tube into steam which forces the raw rubber

against the mold, giving the desired shape to the tube. [Herman Rickman, Butler, New Jersey. United States patent No. 1,210,842.]

THE ARCHER CORD TIRE.

The straight side casing is made up of inner transverse cords *A*, that fit within the intermediate longitudinal cords *B*, on which are superposed transverse cords *C*. The ends of the inner cords are looped over cable strips *D*, formed by strips of frictioned fabric doubled around annular wire cables. The longitudinal cords *B* are interposed between the inner and outer cord layers. The outer transverse cords *C* are looped over cable strips *E*. In the clincher casing the inner cords are bulged inwardly and looped over an inner cable strip and then passed over the ends of the outer cords and looped over the outer cable strip. [Charles L. Archer, Minneapolis, Minnesota. United States patent No. 1,211,035.]



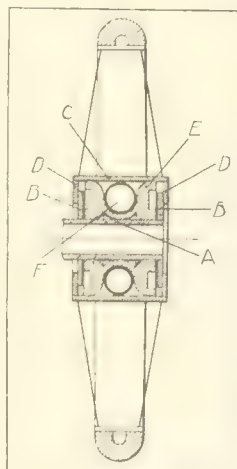
OTHER PROCESS PATENTS.

THE UNITED STATES.

- 1,209,118. Process of making rubber articles. A. Chatham, Akron, Ohio, assignor to the Mechanical Rubber Co., a Corporation of New Jersey.
- 1,209,268. Method of making an inner tube for tires. H. Dech, assignor to Mercer Tire Co.—both of Trenton, N. J.
- 1,209,643. Method of drawing materials. R. B. Price, New York City, assignor to Rubber Regenerating Co., Mishawaka, Ind.
- 1,209,644. Manufacture of hollow rubber articles. R. B. Price, New York City, assignor to Rubber Regenerating Co., Mishawaka, Ind.
- 1,211,228. Manufacture of articles embodying fibrous filaments and vulcanizable plastics. R. B. Price, New York City, assignor to Rubber Regenerating Co., Mishawaka, Ind.
- 1,211,350. Method of making conveyor belts. R. B. Price, New York City, assignor to Rubber Regenerating Co., Mishawaka, Ind.
- 1,211,351. Process of manufacturing rubber articles. R. B. Price, New York City, assignor to Rubber Regenerating Co., Mishawaka, Ind.
- 1,211,487. Method of treating sheets of vulcanizable plastics. R. B. Price, New York City, assignor to Rubber Regenerating Co., Mishawaka, Ind.
- 1,211,962. Rubber foot or shoe and process of manufacturing same. R. B. Price, New York City, assignor to Rubber Regenerating Co., Mishawaka, Ind.
- 1,211,965. Method of manufacturing articles of synthetic composition. E. P. Nicholson, New York City.

MISCELLANEOUS PATENTS.

A FRENCH PNEUMATIC WHEEL.



IN this wheel the pneumatic arrangement is placed in the hub. To the sleeve *A*, two annular disks *B* are attached and casing *C* forms an outside cover. To this are attached two disks *D* completely enclosing the hub. In this space is arranged a pneumatic cushion *E*, of suitable thickness (one or two centimeters at the utmost) and of variable diameter, enclosing an air tube *F*.

The spokes of the wheel are attached to the periphery of the hub, and the disks *B* and *D* may be four or more in number and attached alternately to the hub *A* and the cover *C*.

The pneumatic device is concentrically enclosed in the hub, and turns

with it and with the wheel. [J. Greppi and A. Romanach. French patent No. 481,036.]

New Goods and Specialties.

PINEAU'S CAPE COD PNEUMATIC LIFE SAVING BELT.

LIFE saving devices for use on the water have been invented in great number and variety for many years, but there still remains a place for a device affording adequate protection and safety without inconvenience to the wearer. In Pineau's Cape Cod Pneumatic Life Saving Belt it is claimed that this desirable combination of qualities has been effected. When inflated it contains enough air to float two people weighing 150 pounds each, and when not in

service it can be deflated, rolled into a compact package, and carried in the pocket or grip, taking up less room than an ordinary vest.

To those who cannot swim and like canoeing and boating it affords ease of mind without bodily discomfort, being readily adjustable to the body by side fastenings, and worn either under or outside the clothing. It is also a satisfactory aid in learning to swim, since it allows perfect freedom of the arms for any kind of stroke while preventing the novice from sinking below the surface of the water.

All sizes are furnished, up to 44 inches, the proper measurement being four inches larger than the chest, to allow for inflation. [Athol Manufacturing Co., Athol, Massachusetts.]

CREPE RUBBER FLOWERS.



Rubber lends itself readily to the life-like representation of flowers and other ornaments, and has been utilized in this manner for various purposes a number of years. A new departure is shown in this spray of Ascension lilies, fashioned from unvulcanized crepe rubber. This is but one of a large variety of reproduced blossoms. The slightly crinkled surface of this form of rubber aids in the realistic effect, and the

flowers, be they lilies, morning glories, poppies, hibiscus, or any other blooming plant, are tinted in the natural colorings. As hat trimmings, corsage bouquets, accessories for bathing costumes, etc., a surprising number of effective uses are found for these attractive novelties. [O. H. Hurley, New York City.]

PAPE "THERAPHONE" RECEIVER EARPIECE.

The improved earpiece here shown, when substituted on a telephone receiver for the ordinary earpiece, is claimed to render sound reproductions clear and natural instead of fatiguing, harsh



and confusing. The "Theraphone" earpiece is made of hard rubber, with a true diaphragm seat which prevents all rattling of the receiver membrane. The inverted trumpet-bell tone chamber does not

readily collect dust and dirt when the receiver is suspended from its hanger, and is therefore thoroughly hygienic. The radially fluted trumpet-bell ear chamber fits the ear comfortably and prevents the emitted sound waves from becoming muffled, and a rearward tapering periphery prevents the threaded portion of the earpiece from striking the table line when the receiver is laid on its side for waiting purposes. [The Evolution Phone Co., Inc., New York City.]

TIRE REPAIR PREPARATIONS.

"Pluggum" is the suggestive name for a soft, pliable rubber gum that is applied by simply kneading it into the cut in the tire with thumb and forefinger. It is claimed that this quick-repair gum will be permanently cured into place by the heat of the running tire. [The Miller Rubber Co., Akron, Ohio.]

A new rubber cement now on the market is claimed to be the only vulcanizing cement that dries in 30 seconds and that can be used either for cold patching or vulcanizing with a gasoline or steam vulcanizer in three minutes. Many preparations of this character lose their adhesive quality under the heat caused by the friction of the tube and casing when the car is running, but the slogan for "Vulcanite Cement" is "The Hotter It Gets the Better It Sticks." It is guaranteed not to be affected by either heat or cold and is suitable for repairing any article made of rubber. [Withrow Rubber Co., Grand Rapids, Michigan.]

MOISTURE-PROOF ATTACHMENT PLUGS.

The purpose of the rubber pieces here shown is to make possible the use of separable attachment plugs outdoors, without



danger of short circuiting when exposed to rain. The plug cap is set into the rubber casing and the rubber ring is mounted on the porcelain base just above the threaded portion, which screws into the socket, as indicated in the lower illustration. When the plug is inserted in the socket, the rubber ring is held tightly between the shoulder of the plug and the edge of the socket, making it impossible for any moisture to come in contact with the metal screw shell of either plug or



socket. The cap covered with the rubber casing is then inserted in the plug, making it thoroughly weatherproof. [Harvey Hubbell, Inc., Bridgeport, Connecticut.]

BALANCED WHIP GOLF CLUB.

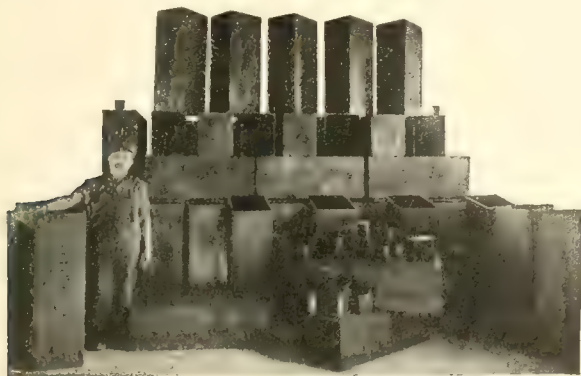
As every player knows, the game of golf is not as easy as it looks, but requires the most practiced skill to attain any degree of proficiency. Every improvement in the accessories is eagerly sought by devotees of the game, but while the golf balls of to-day are much more resilient and better than those formerly in use, the chief improvement in clubs has been in the appearance and greater range of selection, the matter of distance and control remaining practically the same.

An interesting departure is shown herewith in a golf club embodying decided improvement in these qualities. A piece of rubber inserted in the shaft's upper half gives a controlled flexibility which makes it whip-only one way, in the direction the ball is driven, instead of up or down or in a circle, in the provoking manner of ordinary clubs. It is claimed that the perfect balance of this club makes it feel lighter and swing with greater freedom and more force, and this, together with the whip, enables the player to gain greater distance and accuracy. It is also said to prevent the breaking of the club at the head, and when played in the rough, striking stones or turf, the whip breaks the shock and almost invariably saves the club.

These clubs are made in a large variety of weights and styles, including all kinds, from driver to putter. [Balanced Whip Golf Club Co., New York City.]

HARD RUBBER SUBMARINE JARS.

A large percentage of the submarines used by the government has sulphuric acid batteries, and hard rubber jars are required to encase them. The accompanying illustration shows a number



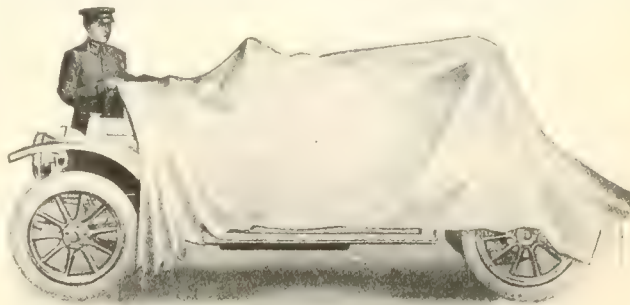
of such jars that are made especially for the United States Government. They measure approximately 12 by 17 inches by 3 feet high, with walls $\frac{3}{8}$ of an inch thick. [The Luzerne Rubber Co., Trenton, New Jersey.]

FLOOR TREADS AND MOTOR-CAR COVERS.

The patent safety tread here shown consists of rubber blocks, vulcanized in galvanized steel, brass or other malleable metal plate and forming a raised pattern. For stair treads and office door mats this device is highly satisfactory, being neat in appearance, noiseless, and affording an absolutely safe foothold.

Waterproof motor-car covers are also furnished by the same

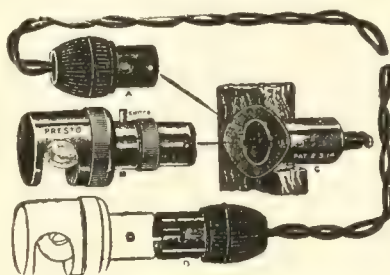
manufacturer which completely cover the car. These are supplied in black and drab proof sheetings, also blue, black or fawn Paramatta cloth. A canvas bag for packing the cover when not



in use is provided. [The North British Rubber Co., Limited, Edinburgh, Scotland.]

COMBINATION DASH AND TROUBLE LAMP.

In ordinary use, this device is a dash lamp, suitable for any car, to illuminate the speedometer, vibrator, clock, pedals, etc. The light is turned on and off by means of a two-way socket.



A threaded lock nut on part B holds the lamp head securely in the dash socket, preventing all rattle and wear of parts.

When desired, it can be converted into a trouble lamp by simply removing the lamp socket B from the dash socket C, using the ten

feet of cord fitted with Bayonet plug and socket. The plug A is then connected to the socket D on the dash and the other end to the reflector and lamp B.

These lamps are finished in nickel-plate, the lamp socket and plugs being made of hard rubber, forming the insulating material, and also supporting the metal plungers and metal contact points which complete the circuit with either the lamp bulb or the plug, as the case may be. [Metal Specialties Manufacturing Co., Chicago, Illinois.]

MARSHALL'S LINEMEN'S SHOE.

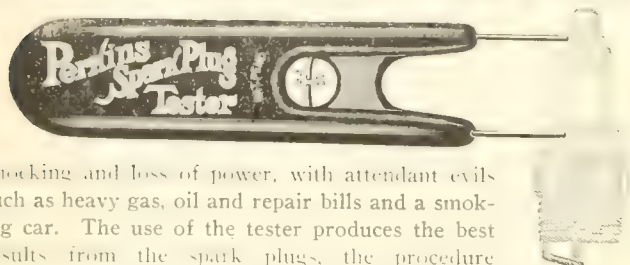
The lineman's calling is a dangerous one and its followers must be fully protected against electric shock. The shoe here illustrated is said to afford absolute protection, on the poles, on the ground, or in manholes, against pressure up to 20,000 volts. This shoe is vulcanized into a solid piece, will not peel nor come apart, and is not affected by oil, gasoline nor grease. The outer surface is of tough red rubber, the outer sole of white, wear-resisting, vulcanized tire-tread rubber. Above an insulated sole of red rubber extending two inches above the heel is a non-moisture absorbing cushion, and the lining of the shoe is embedded in rubber to prevent absorption of moisture. The shoe upper is made of "Standwater" mineral tanned leather, with no glue or grease used in the tanning process. This leather is claimed to be waterproof, current-proof and not affected by heat or cold.



Tests of this shoe in the laboratories of the Edison Electric Illuminating Co., of Boston, Massachusetts, under the direction of the National Electric Light Association, showed the following characteristics: Side of shoe, dry, punctured at 31,500 volts, and again at 34,000 volts; sole of shoe between electrodes in oil, punctured at 55,000 volts; 20,000 volts applied from salt water to salt water for one minute and 30,000 volts applied from salt water to salt water for 45 seconds did not puncture the rubber. [Linemen Protector Co., Detroit, Michigan.]

PERKINS' SPARK PLUG TESTER.

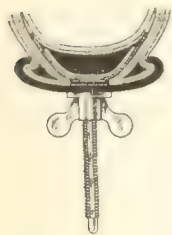
By means of this handy device, which is made entirely of hard rubber, defects in the action of spark plugs may be instantly located. The majority of automobiles have three or four different makes of spark plugs, and in many the plugs are not set at the proper gap and cause uneven running of the motor,



knocking and loss of power, with attendant evils such as heavy gas, oil and repair bills and a smoking car. The use of the tester produces the best results from the spark plugs, the procedure being as follows: See that gaps are set the same as the gap in the tester. Place the tester with one wire touching the terminal cap and the other wire touching the base of the plug. If the plug is operating as it should, a good spark will result, while a broken porcelain or fouled plug will not show a spark in the tester. [A. D. Perkins, New York City.]

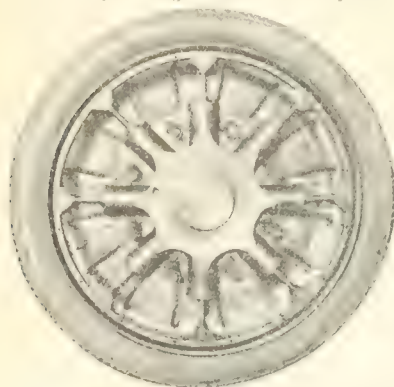
PNEUMATIC SECURITY BOLT.

Although similar in part to the ordinary type of security bolt for pneumatic tires, the one here shown has the customary metal head with its under seat covered by canvas, this canvas being sealed by a piece of rubber and the two forming a pneumatic cushion which serves to hold the tube well out of the way of both bolt and outer cover when fitting. This special, patented form of security bolt is claimed greatly to minimize the risk in the operation of tire changing, that the covers and tubes will be nipped under the beads of the cover or under the security bolts. [The Self-Sealing Rubber Co., Limited, of Hermetic Works, Birmingham, England.]



A PNEUMATIC WHEEL.

A cushion wheel that disposes of the customary pneumatic tire and tube, comprises a solid tire that is cushioned on eight pistons operating in radial air cylinders. This air cushion wheel is recommended for all motor vehicles using solid tires and also for pleasure cars using pneumatics.



The solid tire is flexibly fixed to the radial pistons that automatically compress the air in the metallic air cylinders which are attached to the hub like spokes of a wheel. Thus it is claimed that the jars and jolts incidental to road travel are absorbed and riding quality obtained equal to that of a pneumatic tire. The tire is obviously immune from

punctures and blow-outs and moreover, it is said that the only attention required is an occasional drop of oil in the metallic air cylinders. [Pneumatic Wheel Co., St. Paul, Minnesota.]

"NEW GIANT" SINGLE-TREAD SOLID TIRE.

Trucks of six and eight-ton capacity demand tires of exceptional size, and the one here shown, measuring 42 by 14 inches, is claimed to be the largest single-tread solid tire ever built.



But size is not the only requisite. Of prime importance, and particularly considered in the construction of this tire, is the building and placing of the rubber in such form as will accommodate the internal stresses and displacement with the minimum friction. The resultant stresses within the distorted portion of the tire immediately affected by the load must also be taken into consideration. In the narrow-section solid tire these lateral stresses are relieved by the sides, but in the giant solid tire the sides are too widely separated for such relief. To meet this condition, the

"New Giant" has a series of grooves, scientifically arranged, encircling the outer periphery, thus making it analogous to a number of smaller tires with the additional advantage of all portions working on a single base. These grooves also tend to prevent skidding and assist tractive effort.

Some idea of the colossal size of this tire may be gained from the positions of the men in the picture, C. E. Speaks, manager of truck tire sales, standing beside it, and L. C. Clough, of the truck tire department, sitting within. [Firestone Tire & Rubber Co., Akron, Ohio.]

RUBBER IN THE FLOTATION PROCESS

The flotation process of ore separation makes use of the affinity of finely ground sulphide ores for the froth produced by agitating a solution of water containing a very small proportion of an oil.

The sulphide ore is mixed with about 20 parts of the solution and run to cells where it is agitated either by mechanical means or by blowing air through a porous bottom. A number of substances and constructions have been used to form this porous bottom, but the most satisfactory so far, has been the cotton fabric diaphragm. However, the pores of this cotton fabric rapidly fill up and clog from the ore, and hence do not last long.

Rubber-coated diaphragms have been developed to eliminate the trouble experienced from the regular cotton fabric. It is made of one ply of coated fabric and two plies of regular untreated fabric, all stitched together in rows one inch apart in both directions. In the coated fabric, every thread is completely coated with rubber, but the fabric has been produced in such a way as to make it porous, and the small openings are the proper size to produce the froth required. These diaphragms are necessarily more expensive than the ordinary cotton fabric type, but the increased service is considerably out of proportion to the increased cost. [The B. F. Goodrich Co., Akron, Ohio.]

The Editor's Book Table.

THE CHEMISTRY AND TECHNOLOGY OF PAINTS. BY MAXIMILIAN TOCH. Second revised edition. D. Van Nostrand Co., New York City. [Large 8vo., 366 pages. Price, \$4.]

THIS standard work, which has passed through two editions, has been entirely rewritten and practically doubled in size.

It is an important work for manufacturers of paints, but is also of value to manufacturers of rubber goods because many of the materials described therein are used in the rubber industry. It is especially valuable for the chemist and the laboratory worker, inasmuch as it gives very complete directions for the analysis of many of the materials and solvents used in rubber compounding, the determination of relative purity, the detection of adulterations and the methods of manipulation in the manufacture. There are 83 microphotographs, as well as other illustrations. Valuable tables for conversion of French into English weights and measures, specific gravity of various materials, international atomic weights, and comparative thermometer readings, are also included. In all, the book is one which should find a place in the laboratory of every rubber factory.

Mr. Toch calls attention to the occasional employment of rubber in the manufacture of paint, a fact perhaps unknown to some rubber men. "In certain classes of mixed paints, particularly house paints which are made of corroded lead, sublimed lead, barium sulphate, etc., there is a likelihood or tendency of the pigment to settle. . . . To prevent this . . . a manufacturer feels the necessity of adding a combining medium . . . to prevent the paint from settling hard in the package. Among these are gutta percha solutions, solution of balata, Para rubber, gum chicle, etc. The rubber solutions mentioned serve their purpose very well without injuring the paint."

THE INDIA RUBBER, GUTTA-PERCHA AND ELECTRICAL DIARY and Year Book, 1917. MacLaren & Sons, Limited, London, England. [Large quarto, cloth, 150 pages.]

This annual publication which has been of great value to the rubber trade, not only in Great Britain but all other countries, appears this season in similar form to that of former years, and contains the usual statistical information which has made it so valuable in the past. The trade in rubber goods, both domestic and overseas, is carefully compiled and full statistics are given. The trade index is very extensive, occupying 30 or more three-column pages; the figures of the imports and reexports of rubber are given, and there follow the blank pages for the entry of transactions for each week day for the current year, besides several pages for miscellaneous memoranda. Instead of being interleaved with blotting paper as formerly, several loose sheets are furnished with the book, which is somewhat less bulky and fully as convenient for use. There are a large number of trade announcements, mainly of British rubber manufacturers.

GASOLINE AND HOW TO USE IT. BY G. A. BURRELL, Oil Statistical Society, Inc., Boston, Massachusetts. [281 pages, small 8vo, flexible leatherette binding. Price \$1.50.]

Mr. Burrell, who until recently was in charge of the research laboratory for gas investigations, Bureau of Mines of the United States Government, has performed a commendable work in bringing into this compact handbook a fund of information which is of value to every user of gasoline for motive power, as a solvent, for heating or lighting, for cleansing, or for any other purpose. Precautions for handling, directions for extinguishing fires, directions for detecting the presence of gas, are among the subjects treated, and a large portion of the handbook is devoted to the many points of interest to the automobilist, where engine troubles are treated, and practical directions for overcoming them are given. There is a short section on the use of benzene in the rubber industry. The present shortage of gasoline is con-

sidered, and a history of the petroleum industry embraces a short account of the many refining processes, including the modern "cracking" processes. The extraction of gasoline from natural gas, from shale, etc., is also described. Substitutes come in for description and consideration. Statistics, tables of specific gravity, atomic weights, and nomenclature of the Society of Automobile Engineers are added, making the little handbook a real *vade mecum* for gasoline users.

THE MAINTENANCE OF HEALTH IN THE TROPICS. BY W. J. SIMPSON, C.M.G., M.I., F.R.C.P. William Wood & Co., New York City. [16mo, illustrated, 174 pages. Price, \$1.35.]

American rubber men are instinctively turning toward the plantations of the Far East. Tours of investigation are more frequently chronicled; American capital is already invested in this industry, and more is soon to follow. Thus the American edition of this English publication could hardly have appeared more opportunely. As lecturer on tropical hygiene at the London School of Tropical Medicine, Dr. Simpson is well equipped to deal with this subject, which he has treated comprehensively and concisely in the present volume. The essential information has been presented with the fewest number of words. There are chapters on climate and personal precautions, diet, drinking water, dwelling houses, illnesses of the tropics and their prevention, with special chapters devoted to snake bites and wounds. With this book and the medical equipment advised no man of the north or south need fear for his personal well-being while sojourning along the equator.

NEW TRADE PUBLICATIONS.

THE footwear catalogs of the several factories of the United States Rubber Co. for the year 1917 follow in general style those of previous years, being of the long narrow shape, with handsome covers in colors, each with a distinctive design. They are fully illustrated with large half-tones of all the various styles of boots and shoes, thus, together with the printed descriptions, giving very satisfactory information regarding the goods made in each factory. After showing the styles, a department is devoted to illustrating the shapes of lasts, a side view and a sole view being given, some new shapes being added which are adapted to the latest styles of leather shoes they are intended to cover. The net price-list is given at the end of each book.

As stated above, the covers are distinctive and attractive, those of the Lycoming and "Goodyear Glove" factories bearing neat, well-drawn conventional designs which include the special brand and the U. S. trade-mark. The Boston Rubber Shoe Co. catalog is appropriately decorated with a picture of the Boston Tea Party; the L. Candee & Co. shows a bright lad in a lively shower; the American book pictures a *seringueiro* gathering latex; the Joseph Banigan Rubber Co. presents a couple of automobilists in a snowstorm; the Woonsocket Rubber Co.'s decoration is a fisherman in midstream; the Meyer Rubber Co. contributes a hunter in the wintry woods, while the Wales Goodyear catalog, true to its trade-mark, depicts a polar bear on a cake of ice, with the midnight sun in the background.

Besides these there are the usual net and gross price-lists of the above-named companies, and in addition, net price-lists of knit and felt boots of the Hastings Wool Boot Co. and the Medford Woolen Manufacturing Co., the list of miscellaneous goods, and a special catalog of the Everstick rubbers.

* * *

John Royle & Sons, Paterson, New Jersey, is mailing on request to interested persons a well-printed, 20-page, illustrated

pamphlet describing in considerable detail the Royle six-inch straining machine with the three-way delivery head, displayed elsewhere in this issue. The booklet also contains a summary of the Royle tubing machines, insulating machines and circular looms.

* * *

From the International Rubber Co., Denver, Colorado, we have received the first issue of "More Mileage," the firm's new monthly trade paper in the interests of International Rubber Half-Sole tires. Its bright reading matter and many illustrations reflect a "get-together" spirit among department heads and representatives that invariably makes for success.

* * *

From the B. F. Sturtevant Co., Hyde Park, Massachusetts, comes Binder B, substantially gotten up in red cloth with large titles in gold, in which to file 21 of the company's publications as issued, 7 of them already being in place. Firms having a large and varied product do well to standardize their publications in this manner for the convenience of their customers.

Those equipping rubber factory additions will find interest in the catalogs now available of Sturtevant air washers, Bulletin 226; Multivane volume fans, Bulletin 228; heaters, catalog 230; Autoforce ventilators, Bulletin 232; pneumatic collecting and conveying systems, Catalog 235, and electric fans, Catalog 240.

* * *

The Scientific Materials Co., Pittsburgh, Pennsylvania, has sent out "The Chemical Blue Book," a very valuable catalog and price-list of chemicals, acids and alkaloids, reagents, etc., which is likely to be of value to every analytical chemist and rubber manufacturer. This book gives a most complete list of chemical products handled by the company, containing as it does 4,000 different items with their synonyms, chemical formulæ and processes. A list of international atomic weights is given, and added to this is a list of Kahlbaum's reagents, both English and German names being given. This company claims to have the largest stock of these reagents in the United States, and this is especially notable inasmuch as no more can be secured until after the close of the present European war.

* * *

Those of our readers who have not yet studied the Federal Reserve Act, or who do not fully understand the advantages and the workings of trade acceptances, will find a very informing and interesting explanation in the pamphlet "Trade Acceptances from a Mercantile Viewpoint," by Kenneth R. Hooker, vice-president and treasurer of the Putnam-Hooker Co., Cincinnati, Ohio. The pamphlet can be read in a short time, and gives a thorough explanation of the merits of this plan of merchandising and collections, applicable to all lines of business.

MORE CALENDARS AND SOUVENIRS.

IN addition to the calendars and souvenirs of which mention was made in the January issue of THE INDIA RUBBER WORLD as having been distributed to the rubber trade during the holiday season, it is a pleasure to acknowledge receipt of the following early in January:

SOUVENIRS.

Somerset Rubber Reclaiming Works, reclaimed rubber, Somerset, New Jersey. The most ingenious of the year's offerings, this consists of a white metal clip to hold a filler pad of perforated, detachable memorandum sheets $3\frac{1}{2} \times 4\frac{1}{2}$ inches, each bearing the legend: "What I Am to Do Today." To the thumb-piece of the spring clip is hinged a container for 12 monthly calendar cards beneath a celluloid-covered opening. Thus the calendar may be folded flat for mailing.

* * *

The Boston Woven Hose & Rubber Co., mechanicals, belting, packing, carriage cloth and hose, Cambridge, Massachusetts, distributed one of the handsomest souvenirs of the year. It consists of a 36-page octavo volume entitled "The Story of Rubber,"

and is artistically bound in green boards, printed on dull-finish coated paper, with many half-tone illustrations and several handsome inserts in full color, both on the cover and within the book. After describing what rubber is, how it is obtained, and reviewing the rubber industry and the growth of the Boston Woven Hose & Rubber Co., a journey through its great Cambridge plant is interestingly narrated. By word and picture a very good general idea is given the layman of the methods of manufacturing rubber hose, heels and soles, mats and matting, belting, fruit-jar rings and tape, together with a glimpse into the brass foundry where hose couplings and nozzles of all sizes and descriptions are made.

CALENDARS.

The Adamson Machine Co., rubber working machinery, Akron, Ohio. This displayed a beautiful hand-tinted photographic print, the subject being an attractive waterscape.

Boston Belting Co., belting, packing, hose and mechanicals, Boston, Massachusetts. An art calendar in tones of brown, depicting the Forsyth Dental Infirmary for children, donated to the city of Boston by Thomas A. Forsyth, president of the company.

David Bridge & Co., Limited, engineers and rubber machinists, Castleton, Manchester, England. Six sheets illustrating songs of long ago, each sheet having a humorous picture well printed in three colors on pebbled cream tinted paper. "We'd Better Bide a Wee," "The Wearing of the Green" and "The Gipsy's Warning" make particular appeal to the rubber trade.

Electric Hose & Rubber Co., hose, Wilmington, Delaware. Purely utilitarian in the form of a desk pad for memoranda.

The Rubber Regenerating Co., Limited, reclaimers, Trafford Park, Manchester, England. Its features were a daily tear-off pad and a reproduction in color of "The Passing Train," by Lucy Kemp-Welch, a painting of a plowing scene, with four splendid horses.

The Stamford Rubber Supply Co., rubber substitutes, Stamford, Connecticut. A large daily date calendar.

H. F. Taintor Manufacturing Co., whiting, Paris white, chalk, china clay, etc., New York City.

Tyson Brothers, rubber substitutes and chemicals, Carteret, New Jersey. This was the largest and handsomest calendar of the year, the illustration being a superb four-color reproduction of Moran's painting of the "Falls at Toltec Gorge in the Rockies," measuring $16 \times 22\frac{1}{4}$ inches.

Westinghouse Electric & Supply Co., electric motors and control devices, East Pittsburgh, Pennsylvania. A large calendar for practical office use.

CARDS.

Binney & Smith Co., lampblack, New York City.

Essex Rubber Co., mechanicals, hose, tires, tubes and accessories, packing, cements, sporting goods, heels and soles, Trenton, New Jersey.

Goodall Rubber Co., Inc., jobbers, Philadelphia, Pennsylvania. The season's greetings in the form of a blotter.

The Packard Electric Co., insulated wire, Warren, Ohio.

TRADE-MARK DECISION.

The examiner of trade-marks refused registration as a trade-mark the words "Para Oke—A. & A. R. Co. 100% Line," arranged in a circle, for shoe soles and heels, because of prior registration of the trade-mark of the American Rubber Co., which shows the word "Para" and "Boston" below a line on which appears the words "Rubber Shoe Co." for rubber boots and shoes. The court of appeals has decided that in view of the facts that, first, "Para" is descriptive of rubber, and probably of itself is not registrable; second, that the goods of the applicant and registrant are materially different; and, third, that applicant's mark involves its initials, together with the words "Para Oke," which apparently are not descriptive of the applicant's goods, applicant's mark may be passed to issue if no opposition develops.

Interesting Letters from Our Readers.

OCOTILLO VALUABLE AS A COMPOUNDING INGREDIENT.

TO THE EDITOR OF THE INDIA RUBBER WORLD:

DEAR SIR—My attention was just called to the fact that a clearer explanation should be given about the uses of ocotillo gum, also a reply to the questions asked at the conclusion of the article that appeared on page 75 of the November issue of THE INDIA RUBBER WORLD. The exploitation of ocotillo gum reminds me of a similar experience that I had in 1907, when I worked out an insulating compound using mineral rubber known as No. 620 that answered the underwriters' specifications and kept the cost of the compound down.

In reference to ocotillo gum, L. B. Johnson, of Mesa, Arizona, asked my opinion of it, and I told him I could not give an answer until I had made a few experiments.

The experiments were very satisfactory, as the enclosed sample is a cement stock compound vulcanized 45 minutes at 40 pounds pressure, and composed of smoked sheet, ocotillo gum, M. R. X., zinc oxide, white lead, litharge and sulphur. I used 20 per cent of the ocotillo gum in the compound, and find that it vulcanizes without any objectionable features, as is often true of many new gums.

It provides an excellent gum to add to all friction stocks as it has the valuable power of causing the rubbers commonly used in friction stock to make a better union by penetrating the intricacies of the fabric. This is one of the very valuable characteristics of guayule, long known to the rubber trade.

At first rubber manufacturers did not look on guayule with favor, but today the opposite is true. Ocotillo gum, in conjunction with M. R. X., guayule and a good grade of automobile tire reclaim, produces a remarkably strong adhesive friction stock. Ocotillo has also been found to be a very valuable ingredient in the manufacture of a substitute for leather shoe soles for which there is a great demand; also in cements and repair stocks for automobile tires. Two tires are now in service retreaded with a tread stock compounded with 20 per cent of ocotillo gum and smoked sheet. One of these tires has traveled on the front wheel of a jitney bus over 5,000 miles; the other is on a private car.

Ocotillo gum cannot be used alone in the manufacture of this or similar goods, but it does possess the very valuable property of helping to make a better union, thus preventing separations in many cases, and it has a valuable part to play in the greatest of all businesses, the rubber industry. E. W. SNYDER.

Los Angeles, California, December 19, 1916.

AN ALCOHOLIC POTASH EXTRACTION METHOD.

TO THE EDITOR OF THE INDIA RUBBER WORLD:

DEAR SIR—Your readers will perhaps be interested in my recent investigations indicating a satisfactory method to pursue when the analysis of vulcanized soft rubber is required for specification, or especially for compound analysis.

A known rubber compound containing 10 per cent sulphide, fatty substitute and 40 per cent rubber, the remainder being sulphur and mineral fillers, was taken for the experiment. As it is necessary to reduce the rubber sample to small particles in order to obtain correct results, this compound was first cut with a pair of scissors into the smallest possible pieces. After acetone and chloroform extraction it was boiled for four hours with normal alcoholic potash solution under a reflux condenser. The fatty acid was then determined in the usual way, and only 45 per cent of the total theoretically expected amount was obtained. Repetition of the same procedure with two more samples yielded simi-

lar results. Another was tried and also cut into small pieces with scissors as before, but was boiled for eight hours with normal alcoholic potash solution, when 56 per cent of the expected amount was obtained.

By taking the same compound, however, breaking it down carefully between mixing rollers, and sifting it through 32-mesh screens, 92.82 per cent of the theoretical value was obtained after acetone and chloroform extraction and boiling with the alcoholic potash solution for only three hours.

Passaic, New Jersey.

D. REPNY.

A MENACE TO THE BOLL WEEVIL?

TO THE EDITOR OF THE INDIA RUBBER WORLD:

DEAR Sir—In your January issue a correspondent writes that the boll weevil, advancing at the rate of 65 miles annually, has now covered half of Florida and threatens the Sea Island cotton crop of Georgia. He has overlooked the fact, however, that the latter state holds the record for annual number of lynchings. Sure and awful treatment is dealt out to pests of every sort; a punishment more terrible than the crime never seems to be wanting, and the boll weevil may well hesitate before penetrating far beyond the Florida boundary. Already the convention of Georgia, Florida and South Carolina cotton growers, to be held at Valdosta, Georgia, to-day, indicates an inclination on the part of the State Board of Entomology to take an active hand in giving this latest offender a warm reception.

Admittedly the boll weevil is a menace that must be fought energetically, but meanwhile let us be hopeful of the future.

OPTIMIST.

New York City, January 24, 1917.

ACCELERATED AGING TESTS NOT YET OF VALUE TO THE CONSUMER.

The stenographic report of E. A. Barrier's remarks on this subject before the Rubber Section of the American Chemical Society, as published in THE INDIA RUBBER WORLD of December 1, 1916, does not exactly agree with Mr. Barrier's opinions on this subject, and it is, therefore, a pleasure to give space to his corrected version which follows:

I am quite sure that every consumer wishes to get all of the cooperation he can from the manufacturer, but apparently this aging test is not yet in a condition where it will be of much value to the consumer. It is very evident that no definite conclusion can be drawn in general as to the probable life of rubber from the aging test. What the consumer wants is a test that is absolutely definite; if a sample shows up well after a few days' exposure, he wants to be sure that it will have a certain number of years of life.

As I understand it, in the accelerated aging test a sample may show good results in a ten-day test, but the ten-day sample may last a shorter time in service than a three-day sample. In other words, the test appears to be of value to the manufacturer where he is comparing compounds of the same type, but it does not seem to be of value to the consumer for general application.

There has been a good deal of discussion regarding this test in connection with insulated wire, and it may be that when used in conjunction with detailed specifications, such as those applying to this class of material, the test would be of value. The specifications call for certain chemical and physical requirements which limit the manufacturer to a considerable extent as to the character of compound which he can use. Under such conditions, where chemical and physical requirements are retained in conjunction with the aging test, it may be that the latter test is of value. On the other hand, it certainly is not clear that the aging test has developed to a point where it can be used as a substitute for the ordinary chemical and physical requirements which now generally appear in specifications. It is possible that a study of chemical tests on samples which have been subjected to the aging test will still further enhance its value.

The Obituary Record.

ONE OF THE OLDEST RUBBER MEN IN THE WEST.

JOHAN M. MILLER, for over 10 years manager of the St. Louis, Missouri, branch of The Goodyear Rubber Co., New York City,



J. M. MILLER.

died January 2 as the result of a paralytic stroke. The St. Louis store was opened over half a century ago under the management of George B. Thompson, who employed Mr. Miller as book-keeper 45 years ago. In 1906 Mr. Thompson died, and Mr. Miller, then assistant manager, became his successor. For 15 years past Mr. Miller has suffered from rheumatism, but his indomitable energy and desire to expand the business have kept him active. About six

weeks before his death a paralytic stroke confined him to his home, and he died upon the second occurrence.

Mr. Miller's long association with the trade had made for him many acquaintances and friends throughout the United States, all of whom will be glad to know that Fred Sheppard, president of the company, has appointed Paul Miller to succeed his father in the store which has been located in the same block on Fourth street for over 50 years.

A PIONEER IN RUBBER MANUFACTURE.

Colbee Osmond Benton, an old-time rubber manufacturer, died late in December at his home in Framingham, Massachusetts, aged 81 years. Mr. Benton was born in Lebanon, New Hampshire, June 21, 1835, and at the age of 19 entered the employ of the Canadian Rubber Co., at the time of its establishment in Montreal, Canada, having gone there with Messrs. Brown, Bourn, Chaffee, and Nathaniel Hayward. Mr. Benton realized the growing importance of the rubber industry, and devoted much time and study to compounds and processes. In 1863 he went to Manchester, England, and became superintendent of the Weast Rubber Co., manufacturing mechanicals and footwear. He later established the manufacture of mechanical goods at the factory of the Liverpool Rubber Co.

At that time poor health necessitated his return to his home in New Hampshire, and after two years' rest he became connected with the Boston Car Spring Co. in Boston, Massachusetts. In 1876 he commenced manufacturing sun-cured rubber garment cloth for the Conant Brothers of Boston, at first in Cambridge, Massachusetts, and then in South Framingham, Massachusetts, where a factory was built in 1877. It is said that he was the first man to use African rubber successfully in the manufacture of mechanical goods. In 1885, because of impaired health, he again retired for a time, but the next year associated himself with the Saratoga Rubber Co., at Saratoga, New York, but his health failing, he was forced to retire permanently, and for sev-

eral years past had been an invalid. Mr. Benton was a prominent member of St. Andrew's Protestant Episcopal Church at Framingham. His wife survives him.

FIRST TRAFFIC MANAGER OF A RUBBER COMPANY

Frederick Russell Lyman, traffic manager of The Fisk Rubber Co., Chicopee Falls, Massachusetts, died of pneumonia January 7, at the age of 47. He had been employed by the Fisk company for the past 17 years, coming to it when it was in its infancy. As the originator of its traffic department, he was widely known among railroad men from coast to coast, and was a member of the Traffic Club of New York and the Hampden County Traffic Association. Mr. Lyman is said to have been the first traffic manager of a rubber company in the United States. Besides his wife and mother, he leaves two daughters, a sister and two brothers.

LONG A RUBBER FOREMAN.

J. Franklin Bates, for many years a foreman in the American Rubber Co. plant at Cambridge, Massachusetts, died in that city January 5, aged 62 years. His wife survives him.

JUDICIAL DECISIONS.

PANTHER RUBBER MANUFACTURING CO. v. J. T. S. RUBBER CO. This' cause in equity came up for a hearing upon a motion of the defendant to dismiss a petition of the complainant for a preliminary injunction to restrain it from manufacturing certain patented rubber heels. The defendant's ground for its motion was that claim No. 1 of the patent involved was not infringed by its (the defendant's) heel construction.

The complainant's patent was for "a rubber heel attachment for boot and shoe heels, consisting of a heel section or body molded to a concavo-convex form, and provided with a raised marginal portion and openings therethrough." It was held not infringed by rubber heels manufactured by defendant, which did not resemble in form those described in the complainant's patent. [The Federal Reporter, Vol. 334, page 377.]

MICHELIN TIRE CO. v. E. L. HEARN. Action by the Michelin Tire Co. against E. L. Hearn. Judgment for the defendant. Plaintiff appealed and decision affirmed.

This was a suit for an itemized account, based upon a contract covering a consignment of tires.

Hearn, being adjudged bankrupt, and granted a discharge in bankruptcy, claimed that this discharge included indebtedness on this account. Judgment was so entered. This decision on subsequent appeal was affirmed. [The Southwestern Reporter, Vol. 188, page 943.]

DE LASKI & THROPP CIRCULAR WOVEN TIRE CO. ET AL. v. UNITED STATES TIRE CO. This was an appeal from the District Court of the United States for the Southern District of New York, which decided for defendant in an equity suit by the De Laski & Thropp Circular Woven Tire Co., and the John E. Thropp's Sons Co. against the United States Tire Co. The Thropp patent No. 822,561, for an apparatus for manufacturing wheel tires, was held void for application by prior use. It was held, in this case, that the "date of invention" of a patented device is the date when the invention in its entirety, as patented, was conceived. The decree of the court below was affirmed. [The Federal Reporter, Vol. 235, pages 290 to 295.]

News of the American Rubber Trade.

REPUBLIC RUBBER CO.

At the annual stockholders' meeting of the Republic Rubber Co., Youngstown, Ohio, held January 22, the following directors were elected: M. I. Arms, C. H. Booth, Robt. Bentley, R. E. Cornelius, H. M. Garlick, J. H. Kelly, L. T. Petersen, Thos. L. Robinson, John Tod, John C. Wick, C. F. Garrison.

The directors organized by electing Thos. L. Robinson, president and chairman of the board; L. T. Petersen, first vice-president; J. H. Kelly, second vice-president; M. I. Arms, 2nd, treasurer, and C. F. Garrison, secretary.

A dividend of 2 per cent was declared on the common stock, payable February 1, and 1¾ per cent on the preferred stock, payable March 1. The annual report showed an increase in the company's business for 1916 of more than 75 per cent over that of 1915.

"EXCELLEREX"—A NEW ORGANIC ACCELERATOR.

Nearly all large rubber mills have their own "speeders" that are known by chemists as "catalysers." The composition and methods of use are carefully guarded; however, it is known that aniline oil has usually formed a part of these secret compounds.

While aniline oil gives excellent results there are many disadvantages in its use. For instance, the fumes are extremely poisonous and it is difficult to handle in regard to quantity, as such small proportions as ounces are used in the usual batch of 100 pounds or more. A certain amount of the free oil is lost by vaporizing from the hot mill. To overcome this, and without knowing how to compute this vaporizing loss, a compounder is apt to add a little too much with the result that the rubber does not age properly, and after a certain time loses its life and deteriorates much more quickly than a compound without the oil. It has advantages, however, as a toughener, as a standardizer in removing certain impurities from the rubber and bringing all grades in which it is used to a known uniformity.

"Excellerex" is a dry powder, the result of combining aniline oil with other chemicals and evaporating, drying and powdering.

It is claimed that this material possesses all the advantages of aniline oil without any of its disadvantages, and rubber in which it is used, has not shown the slightest tendency to deteriorate after two years' exposure.

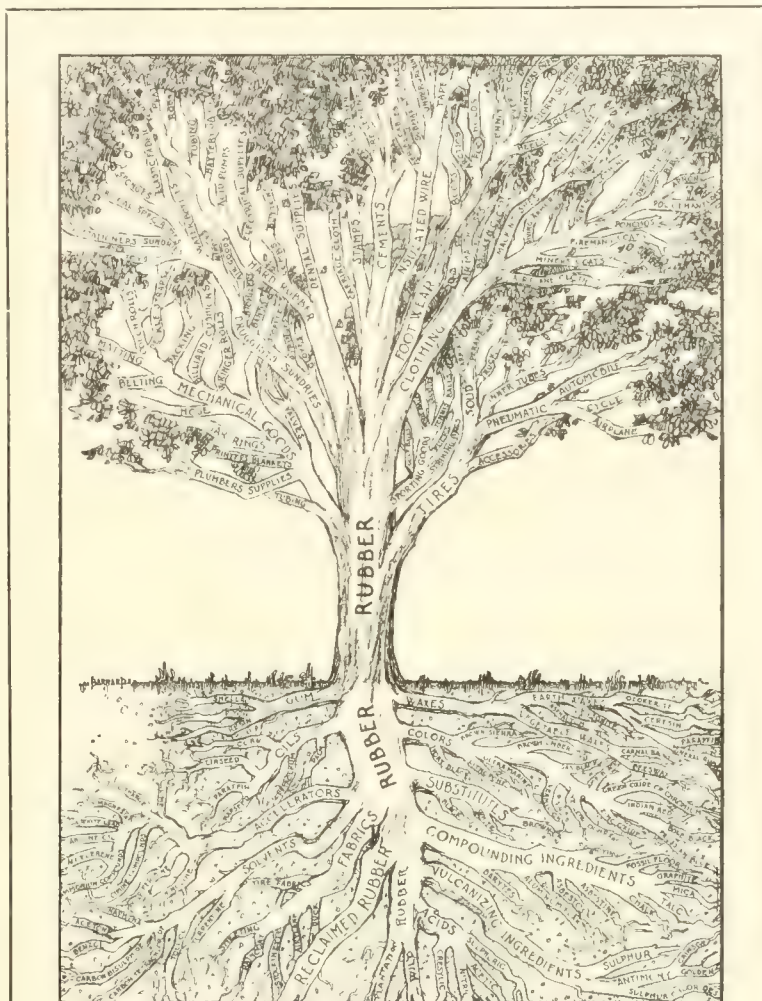
It is really a vitalizing compound, absolutely pure and free of sulphur, that will not vulcanize rubber by itself, yet by using

it in quantities of ½ to 2 per cent, based on the rubber content of the formula, it serves as an accelerator, cutting the cure greatly.

It has been claimed that one ounce of this accelerator will do the work of a pound of litharge; this, however, has not been positively verified.

A MOVEMENT TO IMPROVE SHIPPING FACILITIES.

The rubber industry, dependent as it is upon ships for its principal raw material, and also for export of an increasing amount of manufactured goods, will surely welcome the efforts of the National Marine League of the U. S. A. to encourage and facilitate the growth of an adequate merchant marine. A canvass of manufacturers and exporters is now in progress to ascertain to what extent American commerce is suffering from lack of tonnage. Rubber firms are invited to join in filing with the League at its headquarters, Old Slip, New York City, all known instances of difficulties in the shipment of goods or of cancellation of orders due to lack of shipping facilities, together with particulars and amounts involved. This information will be held confidential if so indicated, the purpose being to arrive at sums total.



THE RUBBER TREE OF THE INDIA RUBBER WORLD.

The rubber industry is analogous to the rubber tree upon which it depends for its existence. Its foundation is deeply rooted in the earth's industry. Subterranean roots grope in all directions to supply nourishment to the parent body. The essential elements combine in the stem to give life and strength that the trunk and limbs may expand. The buds spring forth in response to healthy growth. New branches ramify, giving strength and protection to the structure. Numberless leaves in symmetrical profusion unfold to the sun. Flowers bloom, the fruit matures and pregnant seeds are scattered widely.

"MAGMETCO" BRAND 15-17 PER CENT AND FREE OF FREE SULPHUR.

"Magmetco" is the name of a new brand of crimson and golden antimony recently offered to the rubber trade. It is manufactured by the Magnolia Metal Co., New York City, maker of the well-known Magnolia babbitt metal, and sold by the St. George Chemical Co., 99 John street, New York City. These brands are produced with 15-17 per cent free sulphur and also free of free sulphur.

TRADE NOTICES.

The shop employes of the Cutler-Hammer Manufacturing Co., Milwaukee, Wisconsin, maker of electric controlling devices, received Christmas presents in cash from the firm, and all of the 2,400 employes received a bonus of 10 per cent of their yearly wages or salary as a New Year's gift.

F. Bierman & Sons, St. Louis, Missouri, have recently moved into their new warehouse, which is 100 by 100 feet, contains three floors and basement, and is equipped with a sprinkler system, electric elevator and other convenient arrangements for the handling of their large trade in waste rubber, etc.

The A. & A. Rubber Co., Framingham, Massachusetts, has reorganized as the Archer Strauss Rubber Co., with increased physical and financial strength to meet the growing demands of its business in proofed fabrics.

J. H. Lane & Co. have been appointed sole selling agents of the Exposition Cotton Mills, Atlanta, Georgia. The mills manufacture sheetings and drills with 60,000 ring spindles and 1,550 looms.

The Beacon Falls Rubber Shoe Co., Beacon Falls, Connecticut, recently completed a very comfortably furnished hotel for its employes which will accommodate about 80 people.

The unsecured creditors of the S. & L. Rubber Co., Chester, Pennsylvania, have been paid a dividend of .06077 per cent, in full settlement of their claims.

The Hochschild-Kelter Co., Chicago, Illinois, importer of druggists' sundries, has reorganized under the name of The Hochschild-Walker Corporation, only a few members of the old company remaining with the new corporation. This concern is the exclusive distributor in the Central West for Tyrian automobile tires and tubes.

The McKnight-Sundries Co., Waco, Texas, importer and jobber of druggists' sundries and specialties, during 1916 increased its sales 61 per cent over the previous year, paying a 20 per cent cash dividend to stockholders.

The Imperial Rubber Co., New York City, has been voluntarily dissolved.

At a stockholders' meeting of The Simplex Rubber Co. of America, Inc., Ossining, New York, held December 29, for the purpose of passing upon a proposition for the sale of the assets, the reconstruction, consolidation or merger of the company with the Batavia Rubber Co., resolutions were adopted indicating the favorable attitude of the stockholders toward the affiliation of the two companies in question, and the details of further action were referred to the directors of the Simplex company.

H. F. Baker, of Hartford, Michigan, is seeking a patent on a substitute for hard rubber made from marl, a calcareous clay. This is subjected to a chemical process and is claimed to be an excellent substitute for hard rubber.

The I. T. S. Rubber Co., Elyria, Ohio, is adding several buildings to its plant. The company is a large producer of rubber heels.

The Manhattan Rubber Manufacturing Co., Passaic, New Jersey, announces the opening of offices at 318 Commerce Building, Erie, Pennsylvania, in charge of D. C. Ely.

The Vulcanite Manufacturing Co., Lindenhurst, New York, has increased its capital stock from \$100,000 to \$200,000, and is preparing to add to its plant.

Charles T. Wilson Co., Inc., New York City, has removed its offices from 46 Cortlandt street to 56 Wall street.

H. T. West Co., Inc., Boston, Massachusetts, dealer in chemicals, has removed from 40 Central street to temporary quarters at 113 State street, and on April 1 will be permanently located in the new Fidelity Building at 150 State street.

RUBBER TRADE INQUIRIES.

THE inquiries that follow have already been answered; nevertheless they are of interest, not only in showing the needs of the trade, but because of the possibility that additional information may be furnished by those who read them. The editor is therefore glad to have those interested communicate with him.

[265.] A publication dealing with cost accounting as applied to tire manufacture is sought.

[266.] A correspondent wishes to know where machinery for coagulating and washing plantation rubber may be purchased.

[267.] We have received an inquiry for soft rubber disks about $\frac{3}{8}$ inch in diameter by $\frac{3}{16}$ inch thick.

[268.] A machine which will separate rubber from canvas is sought.

[269.] A foreign subscriber seeks information concerning American manufacturers or importers of accelerators for the vulcanization of rubber.

[270.] A correspondent wishes to know where he can obtain organic accelerators, including hexamethyl-tetramine and thiocarbamide.

[271.] Names of manufacturers of toy rubber balls, dolls and animals are requested.

[272.] Names of firms who build or lease tire-building machines have been requested.

[273.] A correspondent wishes to be advised of manufacturers of machinery required for the weaving of cotton fire hose fabrics.

TRADE OPPORTUNITIES FROM CONSULAR REPORTS.

Samples and prices of rubber heels are desired by a man in Spain. Report No. 23,391.

A merchant in Spain desires to purchase rubber sponges. Report No. 23,393.

A shoe factory in Switzerland desires to purchase 10,000 rubber heels in various sizes and qualities. Report No. 23,409.

A merchant in Spain wishes to secure an agency for the sale of rubber goods, especially automobile tops and inner tubes. Report No. 23,410.

A firm in Switzerland wishes to purchase red and black, hard, vulcanized fiber for the manufacture of pocket knives and cutlery. Report No. 23,505.

Representation of American manufacturers and exporters of pneumatic tires and rubber sponges is desired by a man in Spain. Report No. 23,518.

An agency for the sale of rubber goods is desired by a man in Argentina. Report No. 23,480.

WESTINGHOUSE WELFARE WORK.

The Westinghouse Club, at the plant of the Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pennsylvania, is a remarkable institution. Organized in 1902 primarily for the benefit of technically trained students, this class predominates, although membership in the club is now open to any factory employe. The present membership, recruited from all of the Westinghouse companies in the Pittsburgh district, is now about 850.

The club is operated by a board of directors, three of whom are appointed by the company and three elected by the members, and a paid manager and assistant manager are employed to devote their entire time to the club. Specially appointed committees handle the varied activities, one of the most important being regular classes for the systematic study of the theory, design and application of the Westinghouse apparatus. The 65 by 140-foot gymnasium affords exceptional facilities for athletics; there is a valuable library, and entertainments and lectures bring the members together and increase their happiness and efficiency.

GUTTA PERCHA & RUBBER, LIMITED, CHANGES.

W. G. Fowler has been made manager of the Pacific division of Gutta Percha & Rubber, Limited, Toronto, Canada, and will have his headquarters in Vancouver, British Columbia. Mr. Fowler has been with the company for about 25 years, acting as manager of the Alberta division, with headquarters at Calgary, ever since that branch was opened.

W. R. Wayman has been appointed manager of the Calgary branch.

H. R. Hamilton, formerly manager of the Eastern division, with headquarters at Montreal, has been transferred to the head office at Toronto and appointed assistant manager of the shoe department. R. B. Reid succeeds Mr. Hamilton as manager of the Eastern division.

H. D. McWhirter, former manager of the Central division, with headquarters at Winnipeg, has been appointed manager of both the Central and Alberta divisions, and C. N. Larsen, assistant manager of these divisions.

George Tait, who has completed 25 years of service with the company and who, for many years past, has been manager of the fire hose department, recently celebrated his seventy-third birthday. Mr. Tait has now retired from business on pension.

STUNGO-RADIUM RUBBER CO. BUYS PLANT.

The Stungo-Radium Rubber Co. has purchased a plant at Washington, Pennsylvania, which affords a practically new factory building, 500 feet long and 125 feet wide, with the entire ground floor of steel and concrete construction, and a separate power house, equipped with two 300-horsepower Erie boilers with patent stokers and Sturtevant blowing system for pure air and proper ventilation.

The company will manufacture rubber goods of all kinds, but will specialize in pneumatic automobile tires and solid and cushion truck tires. United States patents have been acquired for the Stungo Special Automobile Tires constructed upon a secret system for which exceptional merits are claimed.

Joseph Stungo, widely known in England and Scotland as a tire expert and technical engineer, will have direct supervision of the entire mill. Employment will be given to 500 mechanics.

BRUNSWICK COMPANY BUILDS WORKMEN'S HOMES.

The large factory of the Brunswick-Balke Collender Co., at Muskegon, Michigan, is rapidly nearing completion and will bring a thousand new workmen from all parts of the country, increasing Muskegon's population by about 4 per cent. The Brunswick company is planning houses for its workmen and to provide for immediate necessities 48 double houses, each of a different pattern, are now being built. Each separate unit will have a large porch, six rooms and a bathroom, and the homes will be sold to the workmen at actual cost, on the easiest terms.

THE NATIONAL RUBBER CO.

James A. Murray is to become president and general manager of the National Rubber Co., Pottstown, Pennsylvania, having resigned his office as vice-president and general manager of the Seamless Rubber Co., New Haven, Connecticut. Mr. Murray will locate in Pottstown permanently in March. In his new position he succeeds Jacob G. Feist, who at the reorganization of the board of directors in February will be named as treasurer.

This change is necessitated by the rapid growth of the National company and is intended to relieve Mr. Feist and allow him more time for outside management. Operations have already begun in the new concrete building of the company and a business of approximately \$4,000,000 is anticipated during the year 1917. There will be no changes in the working force, William C. Walsh being retained as superintendent.

CRUDE RUBBER BROKER EXTENDS ACTIVITIES.

Charles E. Wood, crude rubber broker, with headquarters at 24 Stone street, New York City, has recently had occasion to increase his office space, not only in New York, but in the Hamilton building, Akron, Ohio, as well.

He has also augmented his staff at both points, the new acquisition on the New York end being Drew McKenna, for 15 years



D. McKENNA.



W. M. KORHAMMER, JR.

connected with The B. F. Goodrich Co. Mr. Wood feels that this addition to his organization will not only promote the development of an already progressive enterprise, but will enable him to increase the efficiency of his service to his clients.

The new member of the Akron staff is W. M. Korhammer, Jr., who for a number of years has been in the electrical business, and has severed his connections with the Western Electric Co., of New York City, to accept the position with Charles E. Wood.

PERSONAL MENTION.

J. A. McKenzie, manager of the Victoria, B. C., branch of the Canadian Consolidated Rubber Co., Limited, Montreal, Canada, recently returned from a six months' trip in Australia and New Zealand.

At a meeting of the Rhode Island Shoe Retailers' Association in Providence, Rhode Island, early last month, E. B. Pearson, manager of sales of the Converse Rubber Shoe Co., Malden, Massachusetts, was the speaker of the evening, discussing the cost of rubbers and the reasons for the advance in prices.

A. J. Pennington is in charge of the tire plant of The Brunswick-Balke-Collender Co., Muskegon, Michigan, and M. J. Whalen is in charge of the hard rubber department.

J. R. Gemmill is now in charge of the Chicago, Illinois, branch of the Pennsylvania Rubber Co., Jeannette, Pennsylvania.

E. W. Openshaw, for several years connected with the molded goods department of The B. F. Goodrich Co., New York City, is now with the Hewitt Rubber Co., Buffalo, New York.

M. B. Clarke has resigned as superintendent of the druggists' sundries department of the Gordon Tire & Rubber Co., Canton, Ohio, and the duties of C. W. McKone, superintendent of the tire and tube department have been extended to include the druggists' sundries department.

E. M. Waldo, of the firm of E. M. & F. Waldo, colors for rubber compounding, New York City, is in England for several weeks arranging for supplies of certain products sold by his firm.

NEW INCORPORATIONS.

Advance Rubber Co., January 16 (Delaware), \$2,000,000. F. D. Buck, George W. Dillman, and M. L. Horthy—all of Wilmington, Delaware. Principal office, Delaware Charter Guarantee & Trust Co., 328 DuPont Building, Wilmington, Delaware. To deal in tires, tubes and automobile accessories, etc.

Akron Biltwell Tire & Rubber Co., The, December 27 (Ohio), \$200,000; M. Braley, J. F. Risch, W. H. Kline and W. A. Young. Principal office, Akron, Ohio. To manufacture tires and accessories.

Archer-Strauss Rubber Co., January 4 (Massachusetts), \$100,000. Aaron L. Strauss, 16 Browne street, and Albert Gutterman, 77 Browne street, both in Brookline, Massachusetts, and Calvert B. Archer, 45 Irving place, Framingham, Massachusetts. Principal office, Framingham, Massachusetts. To manufacture and deal in rubber and rubber products.

Automatic Top Sales Corporation, The, January 6 (New York), \$500,000. Donn Wood, Thomas H. Smith, and Baylis M. Dawson—all of 10 Wall street, New York City. Auto top business.

Auto Tire Exchange, Inc., January 12 (New Jersey), \$100,000. Herman Lefkowitz, 127 Johnson avenue; Leo Kaplus, 129 Johnson avenue; Morris E. Rothhouse, 173 Morris avenue—all of Newark, New Jersey. Principal office, 225 Halsey street, Newark, New Jersey. To manufacture and deal in tires, tubes, etc.

Balanced Whip Golf Club Co., Inc., December 1 (New York), \$15,000. Rufus P. Johnston, president and treasurer; P. H. Lynch, vice-president; George N. Vanderbilt, secretary. Principal office, 103 Park avenue, New York City. To manufacture the Balanced Whip Golf Club.

Brooklyn Rubber Works, Inc., January 16 (New York), \$5,000. Axel Larson, 168 East 112th street, New York City; Frederick S. Lafond, Jr., 1117 Carroll street, and Theodore A. Deveer, 28 Boerum place—both in Brooklyn, New York. Tires, etc.

Great Republic Tire & Rubber Manufacturing Co., January 15 (Delaware), \$100,000. W. H. Owens, Denton, Texas; K. M. Dougherty and E. Lynch—both of Wilmington, Delaware. Principal office, Colonial Charter Co., 927 Market street, Wilmington, Delaware. To manufacture and deal in automobile tires, inner tubes and other rubber products.

Hagberg Automobile Co., January 5 (Kansas), \$150,000. C. A. Hagberg (president and general manager), F. L. Fraser (secretary and treasurer)—both of Wichita, Kansas, and R. E. Newberry (vice-president and sales manager). Principal office, Wichita, Kansas. To manufacture and deal in rubber goods, automobile supplies, accessories, etc.

Henry's Tire Shop, December 5 (Oregon), \$5,000. John T. Henry, John Henry and R. H. Cochrane—all of 82½ North Broadway, Portland, Oregon. Principal office, Portland, Oregon. To deal in tires, etc.

Independent Tire Co., December 27 (Tennessee), \$6,000. F. F. Cain, M. E. Cain and A. B. Hatch. Principal office, Memphis, Tennessee. To deal in auto tires and accessories.

Manufacturers Tire & Rubber Co., Inc., January 9 (New Jersey), Eric Windmiller, 43 High street, Passaic; Herman Feder, 335 Belmont avenue, Newark, both in New Jersey, and Justin S. Galland, 25 Broad street, New York City. Principal office, 335 Belmont avenue, Newark, New Jersey. To manufacture machinery, tires, rubber goods, etc.

National Compo. Co., Inc., December 26 (New York), \$5,000. Jacob Meisel, 752 Broadway; Paul R. Gordon, 149 Broadway, both in New York City, and Abraham Litzky, Newark, New Jersey. Insulating materials, etc.

North Star Rubber Co., October 20 (Minnesota), \$50,000. Jeremiah C. Spillane, J. W. Laramy and Samuel H. Greeley, all of St. Paul, Minnesota. Principal office, St. Paul, Minnesota. To manufacture rubber products.

Olsen, Wilson & Stendicke, Inc., January 4 (New York), \$15,-

000. Albert Olsen, 427 East 158th street. William J. Wilson, 511 West 143rd street, and Richard A. Stendicke, 173 East Seventy-fourth street, all in New York City. To deal in auto tires, tubes, etc.

Peerless Tire & Rubber Co., January 5 (Wisconsin), \$50,000. F. E. Burrall, John P. Jessen and A. W. Brown, all of Green Bay, Wisconsin. Principal office Green Bay, Wisconsin. To manufacture and deal in tires, rubber goods, etc.

Samson Tire & Rubber Corporation, January 12 (Delaware), \$1,000,000. James M. Satterfield, L. B. Phillips and J. B. Bailey, all of Dover, Delaware. Principal office, United States Corporation Co., 311 South State street, Dover, Delaware. To deal in tires, etc.

Security Tire & Rubber Co., December 27 (Delaware), \$1,000,000. V. C. Bogardus, H. H. Waller and M. Friedberg, all of 140 Nassau street, Manhattan Borough, New York City. Principal office, Capital Trust Co., of Delaware, Dover, Delaware. To manufacture and sell inner tubes for automobile tires.

Stearns Tire & Tube Co., Inc., December 26 (New York), \$250,000. A. K. Ott, 518 West 161st street, New York City; Henry Pearlman, 2038 Eighty-fifth street, and M. Hawthorne, 1221 Fifty-fourth street, both in Brooklyn, N. Y. To manufacture tires, tubes, etc.

Tire Co. of America, December 12 (Wisconsin), \$2,000. Edward Ver Halen, John Gregory, and E. H. Ludwig. Principal office, Milwaukee, Wisconsin. To manufacture and deal in tires, etc.

Titan Tire & Rubber Co., Inc., January 17 (New York), \$1,200,000. Horace D. Newman, 329 West Forty-eighth street; John J. Gray, 309 East Seventeenth street, both in New York City, and J. Gerald Kenlon, Goytesville, New Jersey. Principal office, Batavia, New York. To manufacture rubber goods.

Utica Tire Exchange Co., Inc., January 13 (New York), \$5,000. Alonzo Hand, Vernon; N. F. Hand and Earl G. Becker, 49 Franklin Square, Utica, both in New York. Principal office, Utica, New York. To deal in tires.

Washington Waterproof Clothing Co., Inc., January 8 (New York), \$10,000. Benjamin Jacobson and L. Jacobson, 1338 Forty-fifth street, Brooklyn, New York, and Hyman Cohen, 611 West 113th street, New York City. To manufacture rubberized clothing, etc.

RUBBER COMPANY SHARE QUOTATIONS.

The following market quotations of shares of rubber manufacturing companies on January 24 are furnished by John Burnham & Co., 115 Broadway, New York City, and 41 South La Salle Street, Chicago, Illinois:

	Bid.	Asked.
Arco Rubber Co., common	76	77½
Firestone Tire & Rubber Co., common	140	145
Firestone Tire & Rubber Co., preferred	107	108½
The B. F. Goodrich Co., common	59½	60½
The B. F. Goodrich Co., preferred	111	112
Goodyear Tire & Rubber Co., common	107½	108½
Goodyear Tire & Rubber Co., preferred	107½	108½
Kelly-Springfield Tire Co., common	59¾	60
Kelly-Springfield Tire Co., 1st preferred	92½	95
Miller Rubber Co., common	248	255
Miller Rubber Co., preferred	107½	108½
Portage Rubber Co., common	164	166
Rubber Goods Manufacturing Co., preferred	110	
Swinehart Tire & Rubber Co.	84	87
United States Rubber Co., common	59½	60½
United States Rubber Co., preferred	110	111

RUBBER COMPANY DIVIDENDS.

The Besaw Tire & Rubber Co. paid a dividend of 7 per cent on all preferred stock from date of issue to January 1, to stockholders of record on that date.

The board of directors of the United States Rubber Co. has declared a quarterly dividend of 2 per cent on the first preferred stock and a quarterly dividend of 1½ per cent on the second preferred stock, payable January 31 to stockholders of record January 15.

The Kelly-Springfield Tire Co. has declared a quarterly dividend of 4 per cent on the common stock, payable February 1 to stockholders of record January 15.

PERSONAL MENTION.

John Clinton, formerly connected with the Boston, Massachusetts, office of the Firestone Tire & Rubber Co., Akron, Ohio, has been given charge of the company's branch at Buffalo, New York.

G. K. Meeks has been placed in charge of the Wichita, Kansas, branch of the Firestone Tire & Rubber Co., Akron, Ohio.

J. C. Withers succeeds W. I. Fornof as manager of the Nashville, Tennessee, depot of The B. F. Goodrich Co., Akron, Ohio.

John L. Butler has been appointed advertising manager of the Pennsylvania Rubber Co., Jeannette, Pennsylvania.

John B. Maus, export manager of The Fisk Rubber Co., Chicopee Falls, Massachusetts, recently returned from a trip through Porto Rico during which he made a close study of conditions there. He finds motoring on the increase, with American cars used exclusively. City streets are narrow but country roads excellent, although hard on tires.

Jesse E. LaDow, of the Mansfield Tire & Rubber Co., Mansfield, Ohio, has been deeply impressed by the exceptional economic and industrial conditions in Japan. Further observation of the growing rubber industry there, its manifest advantages of cheap labor, excellent shipping facilities and proximity to the source of crude rubber, has again led him to write interestingly to several American newspapers, this time from Osaka, advocating an American import tax on all foreign manufactured rubber goods based for each country upon the difference between the cost of labor there and in the United States, plus the increased cost of crude rubber here. This he believes would effectually protect both capital and labor in America.

During the past month, Henry S. Marlor, general superintendent of the Goodyear Tire & Rubber Co., at Williamsport, Pennsylvania, married Miss Mildred Sutton Ward, daughter of Mr. and Mrs. James Henry Ward and great-granddaughter of Cornelius Vanderbilt.

C. A. Jessup has succeeded P. G. Frazier as manager of the St. Louis, Missouri, branch of the Kelly-Springfield Tire Co.

Richard H. Newell, for the past six years connected with The Fisk Rubber Co., Chicopee Falls, Massachusetts, as chemist, is now superintendent of the Dreadnaught Tire & Rubber Co., Baltimore, Maryland.

George M. Martin is in charge of the new branch of the Kelly-Springfield Tire Co., at Minneapolis, Minnesota.

George C. Van Veen has been appointed manager of the newly opened branch of The Mason Tire & Rubber Co., Kent, Ohio, at 1732 Grand avenue, Kansas City, Missouri.

FIRESTONE PROMOTIONS.

Dan C. Swander, formerly eastern district manager of the Firestone Tire & Rubber Co., Akron, Ohio, and one of the company's most energetic workers, has been appointed manager of the Boston branch. L. G. Fairbank has succeeded him as eastern district manager.

C. E. Speaks, formerly manager of the cycle tire department, has been made manager of truck tire sales, being succeeded in the cycle tire department by Henry E. Haws, formerly assistant manager.

W. J. Slater, formerly manager of the sales promotion department, is now special representative of the general sales department, Sherman L. Lewis succeeding him as sales promotion manager.

Salesmen recently promoted to branch managerships are: M. M. Whorley, Syracuse, New York; G. K. Meeks, Wichita,

Kansas; Milton Van Keuren, Albany, New York; A. C. Searle, Minneapolis, Minnesota; H. C. Buchanan, Charlotte, North Carolina.

NEW FISK APPOINTMENTS.

Fred H. Ayers has been placed in charge of the sales organization of The Fisk Rubber Co., with headquarters at the general offices at Chicopee Falls, Massachusetts. Mr. Ayers is well known in Eastern tiredom, having been with the Fisk company since 1905. In 1909 he became manager of the Boston, Massachusetts, branch, and when the sales organization was divided into districts five years later, he was given supervision of all the company's branches in New England and New York State, east of Buffalo, last July becoming supervisor of districts. George T. Newton succeeds Mr. Ayers.



F. H. AYERS

W. H. Barcus, for two years in charge of the Fisk branch at Cleveland, Ohio, has been appointed manager of the newly created Cleveland district, which embraces the company's branches at Cleveland, Toledo, Lima, Columbus, Youngstown, Dayton, Cincinnati and Pittsburgh.

E. J. McMartin, formerly branch manager at Butte, Montana, will have charge of the district about to be created, which includes the branches at Butte, Great Falls, Billings, Salt Lake, Rapid City, Minot and Bismarck.

Roy L. Sergeant, for the past two years in charge of The Fisk Rubber Co.'s interests in the southern end of California, has been placed in charge of the company's business for the entire Pacific Coast territory, with headquarters in San Francisco.

GOODYEAR CHANGES.

F. F. Tilden has been appointed manager of the branch of the Goodyear Tire & Rubber Co. at Columbus, Ohio, succeeding W. W. Magill.

W. S. Boone, formerly branch manager at the Scranton, Pennsylvania, branch, has been made supervisor of city sales at Philadelphia, Pennsylvania.

W. G. Starnes has been elected manager of the Atlanta, Georgia, branch, succeeding J. E. Taylor, who has been transferred to the Dealers' Help division of the automobile tire department at Akron, Ohio.

F. W. Nason, formerly Goodyear manager at Rochester, New York, has been transferred to the export department at Akron, Ohio.

F. N. Hammond, recently branch manager at Youngstown, Ohio, has been made branch manager at Cleveland, Ohio, succeeding R. S. Hartzell, who has been placed in charge of manufacturers' business in Cleveland and vicinity, under the jurisdiction of the Detroit, Michigan, district office. Mr. Hartzell's headquarters will continue at Cleveland.

TRADE NOTES.

Some time ago the receivers of the Dreadnaught Tire & Rubber Co., Baltimore, Maryland, brought suit against certain stockholders who had subscribed for stock and then failed to pay, these unpaid subscriptions being listed among the assets of the bankrupt company. The United States Court in Baltimore has now given judgment against the subscribers, and sums varying from \$42 to \$207 will have to be paid by 16 men, the only ones out of a total of 108 who failed to settle with the receivers after being sued, without waiting for the case to be tried.

In addition to the companies mentioned last month, the McGraw Tire & Rubber Co., East Palestine, Ohio, and the Kelly-Springfield Tire Co., Akron, Ohio, have filed complaints with the Interstate Commerce Commission on freight classifications for rubber tires on the Southern railroad lines.

The New Tread Tire Co., Louisville, Kentucky, has changed its name to International Rubber Sales Co. This company acts as distributor for the International Rubber Half-Sole tires in the State of Kentucky, southern Indiana and southern Illinois, and is establishing agencies throughout this territory.

A grand prize diploma has recently been awarded the Hendrie Rubber Co., of Torrance, California, by the international exposition judges at San Diego, California. This is the more remarkable in that the company started making tires only four years ago.

The Kelly-Springfield Tire Co., New York City, has been awarded damages to the amount of \$376,000 for infringement of the Grant patent on solid rubber tires, the internal wire carriage tire used on the lighter horse-drawn vehicles. The defendants were The B. F. Goodrich Co. and the Republic Rubber Co.

The Globe Tire Co., capitalized at \$1,000,000, will locate at Laporte, Indiana, occupying the old H. B. Glover plant. The company will make pneumatic tires.

The Dayton Rubber Manufacturing Co., Dayton, Ohio, has acquired several acres of land in the vicinity of the factory for the purpose of expanding its plant. It is reported that the company recently closed an order for \$1,000,000 worth of tires. The present officers are J. A. MacMillan, president; J. C. Hooven, vice-president, and C. E. Hooven, secretary and treasurer.

The General Tire & Rubber Co., Akron, Ohio, recently opened a branch at 1120 Michigan avenue, Chicago, Illinois. This is in charge of C. B. Adair. "General" tires are in active request and the company's daily output will shortly be increased to 800 tires. This company is also one of the most important producers of automobile accessories.

The Kelly-Field Co., New York City, formerly sales agent for the Lee Tire & Rubber Co., Conshohocken, Pennsylvania, has been purchased by the latter company from its owner, Harry Field. Mr. Field, whose exceptional ability is well known, will be retained in even closer connection with the Lee company, being placed in general charge of sales as head of the department that is to be organized to take the place of the Kelly-Field organization.

The Scanlon Auto Supply Co., Rochester, New York, now acts as exclusive distributor of the Amazon anti-blowout tire for the Amazon Tire & Rubber Co., Akron, Ohio, in the territory of Rochester and five surrounding counties.

Willard C. Campbell, Isaac C. Ames and Francis C. McCarty have been licensed as commissioners to open books of subscription to the capital stock of The Ames Tire Co. of Illinois, a proposed corporation whose organization has not been completed. This company will have a capitalization of \$10,000, consisting of 100 shares of the par value of \$100 each.

At the recent annual meeting of the Ten Broeck Tyre Co., Louisville, Kentucky, directors were elected as follows: H. L. Lewman, Fred Haupt, W. C. Lewman and F. E. Trumper. The board of directors elected the following officers: H. L. Lewman,

president; Fred Haupt, vice-president; W. N. Cox, treasurer, and W. C. Lewman, secretary and general manager. The report showed that the company had doubled its business in 1916, and considerable improvements and extensions were authorized.

The Zee-Zee Rubber Co., Yardville, New Jersey, has increased its capital stock from \$400,000 to \$1,000,000 to care for the increased demand for Zee-Zee tires and tubes. The latest addition to the mill of this company is practically completed and new machinery will shortly be installed, greatly adding to production capacity.

CLEVELAND ENGINEERS PLAN MANY RUBBER MILLS.

W. C. Owen & Co., engineers, 1900 Euclid avenue, Cleveland, Ohio, announce building operations for the following rubber companies:

Plans and specifications have been completed for a new rubber factory for the A. L. A. Tire Co., Detroit, Michigan, which will have a capacity of 400 tires per day. J. J. O'Shea, president, is now receiving bids for the construction of the building, which will be of reinforced concrete, fireproof, and completely equipped.

Plans are being prepared for The Boone Tire & Rubber Co., Sycamore, Illinois, to remodel the old plant of the Sycamore Tire Co. An addition will also be made to the present building, allowing for an immediate capacity of 300 tires per day and a future capacity of 600 tires per day. Bids are now being received on the equipment.

Complete equipment will be installed for a 500-tire plant for the International India Rubber Co., South Bend, Indiana, of which George W. Odell is general manager.

The new 300-tire plant of the Pearce Tire & Rubber Co., Ashtabula, Ohio, is practically finished, and the Owen company, which designed this building completely, is in the market for equipment.

The general contract for the first unit of the new plant of The East Palestine Rubber Co. has been awarded to Walker & Curley, Pittsburgh, Pennsylvania. The building will be 60 by 450 feet, of brick and steel construction, and the entire plant, when completed, will have a capacity of 300 tires per day. The officers of this company are: Everett Lyon, president; Abram Hartley, secretary, and B. C. Tunison, treasurer.

WHAT SIX TIRE SIZES HAVE DONE.

Although about 50 stock size tires are now manufactured, an interesting canvass recently made by the J. & D. Tire & Rubber Co., Charlotte, North Carolina, shows that only six sizes supplied 94 per cent of all cars built during the year 1916. These were 30 by 3, 30 by 3½, 32 by 3½, 33 by 4, 34 by 4 and 36 by 4½. This indicates that the S. A. E. leadership toward a standardized list of nine regular sizes, and an equal number of oversizes, was a move in the right direction. It also indicates that automobile manufacturers have caught the spirit of standardization to such a degree as for the moment to have wrested the leadership from their engineers, in this particular matter at least. The following table, showing the percentage of use of the 15 sizes most commonly employed during the past year, is of genuine interest:

Size.	Per Cent.
3 by 28	1.80
3 by 30	34.12
3½ by 30	29.15
3½ by 32	7.90
4 by 32	.25
4 by 33	10.10
4 by 34	20.01
4 by 36	.15
4½ by 34	1.55
4½ by 35	.44
4½ by 36	3.34
4½ by 37	.037
5 by 36	.075
5 by 37	.959
5 by 38	.007
	99.951

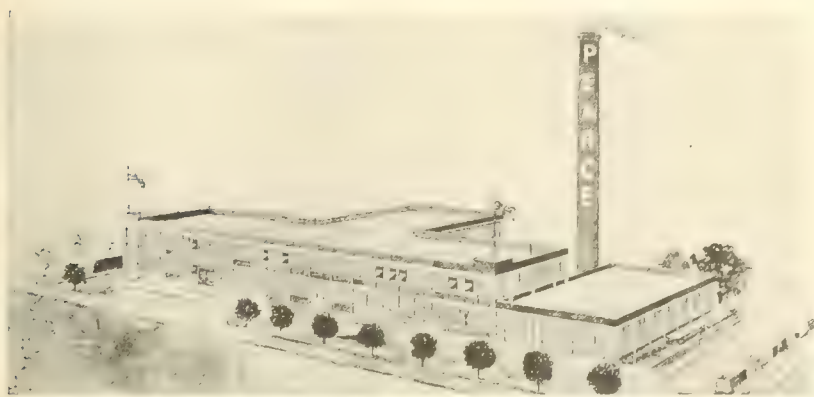
THE TIRE PRICE ADVANCE.

AS anticipated in the previous issue of THE INDIA RUBBER WORLD, the prevailing prices of tires and tubes with few exceptions were advanced from 2 to 20 per cent on January 1. As already explained in these columns, this was the inevitable result of the ever-increasing cost of labor, of compounding ingredients, and latterly of crude rubber itself. The table below gives the approximate percentages of the price advance of six leading firms for the several types of tires:

Ford Sizes.		Pneumatic.		Motor Cycle.		Bicycle Tires.		Solid or Truck.	
Cas-ings	Tubes	Cas-ings	Tubes	Cas-ings	Tubes	Cas-ings	Tubes		
10	5	15	10	15	10	0	0	10-12½	Firestone
15	0	15	0	15	10	0	0	10-12½	Fisk
5-20	10	5-20	10	10	10	0	0	10-12½	Goodrich
15	10	5	10	15	10	15	10	10	Goodyear
7½	0	12-12½	0	10	10	0	0	10	Kelly-S.
11-15	2-10	11-15	2-10	15	10	0	0	10	U. S.

THE PEARCE TIRE & RUBBER CO.

Favorable progress is being made at the plant of this firm in Ashtabula, Ohio, and it is expected that the factory will be finished and machinery installed by April 1. The location is at the foot of Benefit street, where the company has purchased 4¾ acres, about 1,000 feet of which adjoins the New York Central Railroad tracks. The two-story building will be of fire-proof, reinforced concrete construction, faced with brick, and will have 24,000 square feet of floor space. Individual Westinghouse motors will be used to generate power, and automobile tires and tubes in all sizes will be manufactured.



PLANT OF PEARCE TIRE & RUBBER CO.

At a recent meeting of the board of directors A. E. Pearce was elected president, J. L. Smith having resigned, and H. J. Atwood was made secretary-treasurer, in place of P. C. Remick, resigned. The present directors are A. E. Pearce, H. J. Atwood, F. L. Kerr and J. L. Smith, one vacancy being left on the board to be filled at a special stockholders' meeting on March 1 by an experienced Akron, Ohio, rubber man whose name will be announced at that time.

ASHTON W. CANEY ORGANIZES NEW RUBBER COMPANY.

The Titan Tire & Rubber Co., Inc., Batavia, New York, notice of whose incorporation appears elsewhere in this issue, was formed through the efforts of Ashton W. Caney, whose prominent connections with the Batavia Rubber Co. and the Sweet Tire & Rubber Co., of Batavia, have been previously recorded in THE INDIA RUBBER WORLD. The Titan company will make tires and rubber goods and do a general mercantile and contracting business. The present organization is temporary in character, and mention of the definitely formulated plans of this new concern will appear later.

Of value for daily reference in every rubber office.—'The Polyglot Rubber Trade Directory, 1916.'

THE MILEAGE OF THE 1917 TIRE PRODUCTION.

Arithmeticians, whose chief delight is to play with figures, may find a few minutes' enjoyment in checking up those that follow, which emphasize anew the tremendous proportions attained by the principal department of the rubber industry in the United States. Assuming that the American tire production for 1917 will be 20,000,000 as predicted in THE INDIA RUBBER WORLD of December 1, 1916, and considering 5,000 as the average mileage for each tire, the staggering total mileage necessary to wear out the year's output would be 100,000,000,000. A car would have to cover 25,000,000,000 miles in order to wear them out, a distance equivalent to 1,000,000 times the distance around the world, or over 269 times the distance from the earth to the sun. In other words, they would replace the tire wear of an automobile going at the rate of 50 miles an hour day and night for a period of 57,077 years.

MAKING TIRES ON BROADWAY.

In order to show the public exactly what is meant by the term "cord tire," The B. F. Goodrich Co., during the New York automobile show, brought on and set up in the display windows of its building at 1780 Broadway two complete machines used in the Akron, Ohio, factory for the construction of Silvertown Cord tires. Perhaps the nearest thing to human dexterity known to mechanics, they accomplish what no human hand could in maintaining an absolutely equal tension on the cord as it passes back and forth across the surface of the form, making the tire of uniform strength at all points. Workmen, clad in white, operated the machines slowly enough so that the spectator could see how each layer of rubber-impregnated cord is applied and follow the motions of the human-like system of arms and hands which complete their several functions with such mechanical regularity and precision. As a convincing advertisement this instructive window display was a complete success.

PREVENTING TIRE THEFTS.

Year by year the "fully equipped" automobile includes more devices for the comfort, safety and assurance of motorists. Automobiling has become so general that tires are almost as good as ready money; tire thefts have therefore increased greatly and have given accessory manufacturers another subject for the application of their utmost ingenuity. But this year marks the entrance of some form of protection against tire theft as a frequent part of the regular motor car equipment. Perhaps the cleverest of the several schemes seen at the New York automobile show is that by which an extra wire wheel with tire attached is securely locked to the rear deck by means of a stud through the wheel flange. No straps or chains are required in connection with this locking device.

GOODYEAR TO MAKE OWN FABRIC.

The Goodyear Tire & Rubber Co., Akron, Ohio, which has taken a large proportion of the output of the Killingly Manufacturing Co., of Killingly, Connecticut, has now secured control of that manufacturing plant. A new company has been incorporated with \$5,000,000 under the name of the Goodyear Cotton Mills, the incorporators being Francis Seiberling, Fred Miller and Harold Hutchins. The plant is a large one with steam and water power, and its present equipment of 17,500 ring and 1,200 twisting spindles, and 60 broad looms will be further increased. It is reported that the new company has decided to erect a large yarn mill and 100 tenement houses in Williamsville, Connecticut, in the immediate future, this mill to have a capacity of 100,000 pounds of tire yarn per week.

THE UNITED STATES RUBBER COMPANY'S RE-FINANCING PLAN.

THE refinancing of the United States Rubber Co. by the issue of \$60,000,000 bonds, which, it is expected, will be authorized by the stockholders at a meeting on the fourteenth of this month, is a move of more than ordinary interest in both rubber and financial circles.

These 5 per cent bonds maturing January 1, 1917 are to be secured upon the properties owned or controlled by the company by direct mortgage thereupon or by pledge of mortgage bonds of the companies owning or controlling the same, or by pledge under the mortgage of the United States Rubber Co., or under the mortgages securing the mortgage bonds so pledged, of shares of stock of the companies owning or controlling the same with a covenant not to permit mortgages thereupon. It is understood that the purpose is to provide for the payment of all maturing obligations of this great corporation with certain minor exceptions. It is intended that all existing bonds and liens upon the properties of the company or its subsidiaries will be paid on or before December 1, 1918, the exceptions being \$2,600,000 gold bonds of the Canadian Consolidated Rubber Co. maturing in 1946 and \$9,000,000 debentures of the General Rubber Co. due December 1, 1918. The latter will be left undisturbed for the present, as the company announces it has under consideration other plans for dealing with its important crude rubber interests. Of the \$60,000,000 bonds to be issued forthwith, \$24,697,148.07 is to be set aside to retire the following:

United States Rubber 6 per cent bonds due December 1, 1918.....	\$16,000,000.00
Eureka Fire Hose Manufacturing Co. 5 per cent bonds due December 1, 1918.....	970,000.00
Canadian Consolidated Rubber Co., Limited, 5 per cent debentures due December 1, 1918.....	2,500,000.00
Morgan & Wright 5 per cent debentures due December 1, 1918.....	5,000,000.00
Mechanical Rubber Co. 6 per cent first mortgage bonds due January 1, 1918.....	\$687,000.00
Less sinking fund deposited with trustee	459,851.93
	227,148.07
	<hr/> \$24,697,148.07

The remaining bonds presently to be issued are to provide for the funding of current indebtedness, for additional working capital, for discounts and premiums in connection with the above refunding and for other corporate purposes. Another \$10,000,000 of the bonds may be issued for working capital, and for development, and for other purposes, and out of the remaining bonds reservation is to be made to provide for the \$9,000,000 General Rubber Co. 5 per cent debentures due December 1, 1918, until otherwise provided for, and the \$2,600,000 Canadian Consolidated Co. bonds, due October 1, 1946. Any additional bonds, and any bonds not used for such refunding are to be reserved for capital expenditures made after January 1, 1917, for additions, betterment, improvements, or for new properties, at 75 per cent of cost.

The circular sent out by President Samuel P. Colt states that the net earnings of the company and its subsidiary companies available for interest during these years, as found by Messrs. Haskins & Sells, have been:

For the fiscal year ending December 31, 1914.....	\$10,690,988.48
For the fiscal year ending December 31, 1915.....	11,539,313.10
For the fiscal year ending December 31, 1916 (partly estimated)	12,500,000.00

The above net earnings are after deducting expenses of every nature, except interest, and including expenditures for repairs and renewals through which the plants are maintained in the

highest state of efficiency. The average losses from bad debts during these years have been less than 1/2 of 1 per cent of the total sales.

Further, the circular states that the consolidated financial position of the company, and its subsidiary companies, as of October 31, 1916, but after applying the proceeds of the sale of these \$60,000,000 new bonds, is appraised as follows:

Property, plant and equipment.....	\$54,850,204.33
Manufactured goods and material.....	48,791,238.61
Securities owned	1,731,870.29
Net current assets, consisting of cash and receivables, less payables.....	30,840,293.38
	<hr/> \$136,213,606.61
Undisturbed bonds:	
Canadian Consolidated Rubber Co., Limited	\$2,600,000
General Rubber Co.....	9,000,000 11,600,000.00
	<hr/> \$124,613,606.61

The underwriting was arranged by Kuhn, Loeb & Co., and it is understood that the American International Corporation is also interested in the transaction, which seems to presage the further acquisition of plantation acreage in the Far East to insure an adequate supply of crude rubber. Subscriptions were solicited on January 17 at 96 3/4 per cent, and were largely oversubscribed when the books closed on January 23 to such extent that only about 60 per cent of amounts subscribed for could be allotted.

In this connection it is reported as probable that W. S. Kies, vice-president of the American International Corporation; C. B. Seger, vice-president of the Union Pacific Railroad, and J. S. Alexander, president of the National Bank of Commerce of New York City, will be elected directors of the United States Rubber Co. at an early meeting.

RUBBER FOOTWEAR PRICES.

AS was anticipated in the January number of THE INDIA RUBBER WORLD, the rubber footwear manufacturers sent out new price-lists the first of the year showing a material increase in the net cost of these goods to wholesalers and retailers. The United States Rubber Co. made a few changes in its gross price-lists, and these were confined to the red and white goods manufactured by that company by pressure process. The discounts of former years have been reduced to this extent: Last year first-quality goods were bought at 25 and 5 per cent off, with a further 5 per cent for early orders. On second quality the terms were 25, 5 and 10 per cent, besides the usual 5 per cent for early orders.

This year's discounts are 15 per cent off on first quality, and 15 and 8 per cent on second quality. On the differential brands, namely, Woonsocket, Meyer, Rhode Island and Jersey there is an additional 5 per cent. The discount for early orders is now allowed until the first of June for jobbers, who can, if they wish, allow this same 5 per cent discount until the first of May to their customers.

It will be seen that this makes a very considerable increase in the net cost of goods both to the wholesalers and retailers. Such portions of the orders given in 1916 which were not filled on December 31 were to be considered cancelled unless re-ordered by the customers. It is stated that although the company's sales were 15 per cent larger than the previous year, a large proportion of the orders remained unfilled because of lack of capacity of the factories, and it is expected that the coming year's business will surpass that of last year by a large amount.

COPY OF INDEX TO "Rubber Machinery" will be sent free upon request.

THE RUBBER TRADE IN BOSTON.

By Our Regular Correspondent.

ON December 28, George E. Hall, general manager and vice-president of the Boston Woven Hose & Rubber Co., of Cambridge, Massachusetts, entertained the heads of the 45 departments of the factory and business offices, at a dinner given at the City Club in Boston. The utmost good fellowship prevailed and a number of humorous "stunts," followed by a motion picture show, provided entertainment. Five reels showed the rubber industry from gathering the latex in a Brazilian forest, through the various manufacturing processes in the factory of the company, to completion in the form of the various products which the firm manufactures. This was supplemented by several reels along other lines, presenting pictures of comedy and human interest.

The Boston Woven Hose & Rubber Co. recently announced that, beginning January 15, all employes who had completed two years of continuous service with the company would be presented with an insurance policy amounting to at least \$500 and providing for an increase in value for each additional year of service from the above date. The company, as a reward for long service, also distributed gold pieces to employes of ten or more years' standing. The coins ranged from \$5 to \$20.

Honors seem to come thick and fast to Thomas A. Forsyth, president of the Boston Belting Co. Last month it was chronicled in this column that he had been made an honorary member of the Sigma Delta Sigma Fraternity—the first person outside the dental profession to be admitted to that society in the last 50 years. That the dentists of this country appreciate Mr. Forsyth's broad philanthropy, in giving to this city the great dental infirmary, was further evidenced last month when over 500 dentists from all over the country tendered him a dinner, while members of the profession, not only in this country, but even as far away as

Japan, observed "Forsyth Day" in his honor. There were present the Governor of Massachusetts, the Mayor of Boston, the presidents of Harvard University and Tufts College, the president and the president-elect of the National Dental Association, the president of the Massachusetts Dental Association, Dr. Harvey W. Wiley, and many other distinguished men. Mayor Curley in his address announced that a street near the Boston Belting Co.'s factory had been renamed Forsyth street, and Dean Friesell, of the dental department



THE FORSYTH CUP.

of the University of Pittsburgh, reported that its trustees had voted to confer on Mr. Forsyth the degree of Doctor of Laws. But the feature of the evening was the presentation of a beautiful silver loving cup subscribed for by dentists all over the world. This massive cup, shown by an accompanying illustration, is of graceful design, depicting in high relief 18 figures of children in graceful postures, while around the rim runs an appropriate inscription. Mr. Forsyth accepted the cup with a brief and graceful expression of appreciation and the happiness which this gift, as

well as the work of the infirmary, would always give him. The affair was a fitting tribute to the man who has spent millions of dollars to alleviate suffering by the children of this city.

A fire starting in the churn room of Stowe & Woodward Co., Newton Upper Falls, Massachusetts, rubber manufacturers and proofers, practically demolished the entire spreading plant, with an approximate loss of \$20,000. Fortunately, the power plant, storehouse and hard rubber department were not damaged, and the company is now making plans to put up a cement building somewhat larger than the former wooden building and expects to be running again in two or three months. Meanwhile, orders in the spreading line are being cared for at the Campello, Massachusetts, factory of the company.

Another fire, which might have been much worse, was that at the Converse Rubber Shoe Co.'s plant in Malden on January 21, where a frame structure, used as a temporary storehouse, gave the firemen three hours of lively work, keeping the flames away from another building in which solvents were stored. The loss to the company was comparatively small.

Superintendents and foremen cannot impress too strongly upon workmen the danger attending the handling of gasoline, naphtha and similar solvents. Only last month two men in the employ of Bartels & Thelan Shoe Co., Chelsea, were sent to the storehouse to get some rubber cement. The storehouse was dark, and one of them held a match over the bung-hole of a cement barrel. The result was an explosion; both men were severely injured and several hundred employes rushed from the factory in disorder, returning, however, upon learning that there was no further danger. The fire department was called out, but the monetary loss was small.

An accident occurred last month in a dry-cleansing plant in Lewiston, Maine, where nails in a workmen's heel struck a spark which ignited gasoline vapor, and in an instant the whole establishment was ablaze and a loss of \$4,000 resulted. This is a phase of the danger from rubber solvents which it may be well to recall. Many factories nowadays have concrete floors, and friction from heel-nails is quite likely to create a spark, with disastrous results. The moral is for rubber employes to wear rubber heels.

The main shaft at the Boston Rubber Shoe Co.'s plant in Malden was fractured a few weeks ago, requiring a shutdown of two days in several of the departments. This shaft was 17 inches in diameter and was driven by a 1,200-horsepower engine. A number of emergency motors were brought into use, thus enabling some of the machinery to be run. The break happened at an unfortunate time when the factory was running to full capacity on orders, in many departments double shifts of workers being employed.

The Hood Rubber Co., East Watertown, has completed plans for the erection of a foundry and pattern shop on land contiguous to the factory. The new building will measure 80 by 160 feet, two stories high.

The prevailing high footwear prices and the growing demand for rubber-soled shoes, also the increasing call for rubberized fabrics, rubber and fiber compositions in the manufacture of footwear, were concisely explained by W. E. Barker, manager of sales of the United States Rubber Co., at a recent luncheon of the National Shoe Wholesalers' Association in Boston, when he stated that American stocks of manufactured footwear today

total \$15,000,000 less than a year ago, and \$8,000,000 less than two years ago. In this connection W. H. Palmer, of the United States Rubber Co., at the annual convention of the National Shoe Retailers' Association in Cincinnati, Ohio, not long ago, reviewed the remarkable growth of the rubber sole business and also stated that the shipments by his firm of canvas upper, rubber-soled footwear for the year ending August 31, 1907, amounted to 149,374 cases, but that since then the business has increased more than fourfold.

* * *

The J. W. Wood Elastic Web Co., of Stoughton, Massachusetts, is erecting the second large addition to its plant during the past year. The new building will be 60 by 125 feet, of especially heavy construction, two stories high, with walls of reinforced concrete, and when completed, the work which has been done at Brockton in the past will be taken care of in the new building.

* * *

Dr. Warren K. Lewis, professor of chemical engineering at the Massachusetts Institute of Technology, Cambridge, has been appointed consulting chemist for the Goodyear Tire & Rubber Co., Akron, Ohio. He will still hold his professorship at this great technical institution, taking trips to Akron as occasion may demand.

* * *

Francis H. Appleton, the well-known manufacturer of reclaimed rubber, was reelected Chief Rabban of Aleppo Temple, Mystic Shrine, in this city, last month. Captain Appleton stands very high in Masonic circles. He was also one of the committee to visit England a few years ago, to tender to King George the certificate of honorary membership in the Ancient and Honorable Artillery of this city.

* * *

Lester Leland, vice-president of the United States Rubber Co., was reelected a director of the American Trust Co. at its annual meeting. Mr. Leland resigned his position as director of the Second National Bank, the vacancy being filled by Matthew C. Brush, president of the Boston Elevated Railway.

THE RUBBER TRADE IN AKRON.

By Our Regular Correspondent.

EMPLOYEES of the Firestone Tire & Rubber Co. are responding enthusiastically to the newly inaugurated stock distribution plan whereby it is possible to become a stockholder in the company. The plan provides for the distribution of one to ten shares of stock to each employee, according to term of service. It can be purchased at \$100 per share, although the present market value is about \$140. Easy payments can be made for five years, during which period the stock must remain on deposit with the company.

At the annual dinner to the 500 superintendents, foremen, department heads and their wives held recently in the Firestone clubhouse, President H. S. Firestone outlined the company's offer and its object. "We want to hold the interest of our employees," he said. "The only way to do that properly is to give them a real interest in the company. It is better for the company and better for the men. If you have a real interest in the work you do, there is nothing in the world that gives you more pleasure than your work, and at the same time you become much more efficient."

R. E. Lee, R. E. Glass, L. B. Walters and R. C. Lepper also spoke at the dinner, and J. W. Thomas, general superintendent, acted as toastmaster. Motion pictures and music furnished pleasing entertainment.

President Firestone recently purchased a beautiful winter home in southern Florida, where he and his family are to spend the latter part of the winter.

The books of The B. F. Goodrich Co. have been closed for the purpose of compiling the full annual report for the year 1916. The results are as follows, subject only to the verification of public accountants and auditors:

After making full provision for all maintenance charges, depreciation, bad and doubtful debts, and other items which it was deemed wise to take out of the year's earnings, the net profits for the period amount to approximately \$9,550,000.

This amount, added to the surplus carried over as at December 31, 1915, of \$10,580,000, shows undivided profits of approximately \$14,900,000 after deducting the four quarterly dividends of $1\frac{3}{4}$ per cent on the preferred and 4 per cent on the common stock outstanding, together with the following provisions: \$700,000 for the redemption of preferred stock; \$121,460 representing the reduction of preferred stock purchased from cost to par, and \$100,000 appropriated for pension fund.

At the regular quarterly meeting of the directors held on January 24 a dividend of $3\frac{1}{2}$ per cent was declared on the preferred stock, payable $1\frac{3}{4}$ per cent April 2, and $1\frac{3}{4}$ per cent July 2.

A quarterly dividend of 1 per cent was declared on the common stock, payable May 15, 1917.

The directors voted, subject to the approval of the stockholders at their annual meeting March 14, to retire 9,000 shares of preferred stock prior to July 1, 1917. This makes a total retirement of 36,000 shares covering the charter provision for retirement of preferred stock up to July 1, 1917.

The net earnings for 1916 were less than those of 1915, which is largely due to the fact that advances in selling prices have not kept pace with rapidly increasing costs. However, the directors consider the results satisfactory under the conditions which prevailed.

During the past month 50 representatives of the waterproof clothing department of The B. F. Goodrich Co. met at the home office for a week's convention. Formerly, mere utility governed the waterproof garment situation but, nowadays, cut and style and originality play as large a part in this type of clothing as in any other. J. W. Jones, sales manager of this division of the Goodrich company, stated that the finest artists and models obtainable are employed in creating new models from year to year in keeping with other styles in men's and boys', ladies' and misses' clothing.

W. O. Rutherford, general sales manager of the Goodrich company and a director of The Motor and Accessory Manufacturers, was one of the prominent visitors at the automobile show in New York City during the past month.

Henry C. Geer, formerly general foreman of the Goodrich company, was recently placed on the retired list, after 35 years' service, following a remarkable record of only three weeks' absence, caused by illness, in all that time. He is now taking a prolonged vacation at Miami, Florida. When Mr. Geer entered the employ of the Goodrich company, its products consisted of rubber rolls for wringers, solid rubber tires for high-wheeled bicycles, and rubber hose, while to-day the company manufactures over 10,000 different rubber articles.

* * *

Men from practically every quarter of the civilized globe take part in the making of Goodyear products, and an interesting organization formed by The Goodyear Tire & Rubber Co. to aid in the true Americanizing of these varied elements is the Goodyear Cosmopolitan Club, composed of workmen representing 20 different nationalities. The charter members are men of prominence and influence among the men of their respective nationalities and with the utmost enthusiasm for American institutions and ideals, and will undoubtedly be instrumental in promoting fraternal feeling.

The previously mentioned citizenship classes maintained by the Goodyear company for alien workmen are also a valuable aid

in furthering an intelligent conception of American principles of government and other matters calculated to increase the usefulness of these men in the land of their adoption. In this connection it is interesting to note the new division of the company's school which has been inaugurated for deaf mutes, about 200 of these "silent" workers now being employed at the Goodyear plant.

Charles Seiberling, son of C. W. Seiberling, vice-president of the Goodyear company, and L. G. Odell, of the crude rubber department, recently departed for India on an extended tour.

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At the recent annual meeting of the General Tire & Rubber Co. the officers were reelected and the following directors named: M. O'Neil, W. F. O'Neil, W. E. Fouse, G. F. Burkhardt, J. A. Diebolt and T. F. O'Neil. M. O'Neil is president; W. F. O'Neil, vice-president and general manager; W. E. Fouse, secretary and Charles Herberich, treasurer. A quarterly dividend of $1\frac{3}{4}$ per cent was declared on the \$200,000 issue of preferred stock. The company has also \$300,000 outstanding in common stock and is building an addition to its factory in East Akron.

* * *

The annual report of the Portage Rubber Co., recently submitted to shareholders showed a net profit of \$232,000. This is approximately 16 per cent on the present outstanding stock and shows a net increase of 81 per cent over the previous year. B. J. Wildman, former Chicago manager, was elected secretary to succeed W. J. Anderson, who is no longer with the company.

* * *

The Mohawk Rubber Co. has increased its common capital stock from \$500,000 to \$1,000,000. The company retains the \$50,000 of preferred stock which it had, thereby securing a total capitalization of \$1,050,000. The new stock has not been placed on the market, but will be partially distributed among the stockholders as a stock dividend, and the balance held in the treasury temporarily. This increase was made necessary by recent additions to the factory and increased business.

* * *

The Akron Biltwell Tire & Rubber Co., notice of whose incorporation appears elsewhere in this issue, will shortly commence the erection of a factory in the eastern part of the city. The main building will be of brick construction, 60 by 150 feet, two stories high.

* * *

John W. Herron, formerly assistant to H. H. Henderson, succeeds the latter as manager of the Akron office of Henderson & Korn, crude rubber importers, Mr. Henderson going to the New York City office of the company.

THE RUBBER TRADE IN RHODE ISLAND.

By Our Regular Correspondent.

THE rubber factories throughout Rhode Island continue to be rushed to their capacity with business in all lines, with no indications of any immediate cessation either in orders or operations. The makers of tennis and other shoes are especially busy. Nearly all of the plants have been closed for a few days each for the taking of an inventory, but have resumed under a higher pressure than ever, frequent newspaper warnings that retail prices on rubber goods were to be advanced having resulted in exceptional demands.

One of the greatest handicaps that the rubber manufacturers in this vicinity have had to face during the past year and a half has been the scarcity of help of even mediocre ability, while expert rubber workers have been almost priceless. Even the payment of the highest scale of wages ever paid in Rhode Island rubber plants has failed to secure the desired number of operatives.

The O'Bannon Corporation, with extensive holdings in West Barrington and East Providence, has purchased the International Rubber Co.'s plant, also at West Barrington, and will change the firm name to the International Rubber Cloth Co. Richard LeBaron Bowen, general manager, announces extensive enlargement, and the employment of fully a hundred more operatives. The International Rubber Co. has been engaged for some time in making automobile tops, rubber coverings and other goods, employing approximately 125 persons. The O'Bannon Corporation also has a large plant at Phillipsdale, known as the Nonnabo Chemical Co., where cellulose products are made, and a second at West Barrington, where artificial leather is manufactured. The concern will employ approximately 1,500 persons in its three plants.

* * *

Another phase of the various suits against alleged infringement of the so-called Osburn patents for flexible electrical conduits was brought up before Judge Arthur L. Brown in the United States District Court for Rhode Island recently, with the hearing of the case of W. C. Robertson *et als* against the Tubular Woven Fabric Co., of Pawtucket.

According to the allegations made by the plaintiffs, the Tubular Woven Fabric Co. is now making a conduit which is an infringement of the Osburn patent, as was the original product of this concern, which it stopped manufacturing when it was adjudged guilty of infringement through previous proceedings. The plaintiffs have therefore now brought a supplementary bill to determine whether the new product of the defendants is also an infringement. Two days were required in the presentation of the arguments, during which numerous samples of the conduits manufactured by the two companies were brought into court for inspection. The matter was taken under advisement by Judge Brown.

* * *

The Millbury Rubber Co., Millbury, Massachusetts, has been incorporated under the laws of Massachusetts, with a capital stock of \$90,000, in which Worcester men are largely interested. The new concern will take over the plant of the Stoddard Rubber Co., Inc., and operations will begin in a few days.

The new company is authorized to issue \$30,000 in preferred stock and \$60,000 in common stock, practically all of which will be held in Worcester. The permanent officers of the corporation under the reorganization are as follows: DeForest E. Martin, president; Albert W. Blackmer, treasurer and clerk; DeForest E. Martin, Albert W. Blackmer, Warren F. Holden, Albert F. Richardson and Francis H. Dewey, Jr., directors. Automobile tires and other rubber goods will be manufactured on an extensive scale, new equipment being installed and additional employees taken on as rapidly as business conditions warrant.

* * *

The great success that has attended the introduction of specialized sand blast machines in rubber plants for use in automatically cleaning automobile truck tire rims, cutting off any barbs that may occur, and in reducing inequalities has caused an increasing demand during the past year. H. J. Astle & Co., Providence, has installed several in the United States, also in Canada, England, South America and elsewhere. At present two large machines are being constructed, one for the Russian-American India Rubber Co.'s plant at Trengolnik, Petrograd, Russia, and the other for the Canadian Consolidated Rubber Co., Limited, Kitchener, Ontario.

* * *

The Tamarack Co. has started the erection of a large addition to its Pawtucket plant to take care of heavy orders for the manufacture of automobile tire fabric.

The new building will be 110 by 193 feet, of mill construction, three stories and basement. It will increase the floor space by

80,000 square feet, and will give employment to 1,200 more men about the first of March.

* * *

Arthur Carr has been made general superintendent of the Revere Rubber Works, Providence. Although but little more than 30 years of age, Mr. Carr has been in the employ of this concern for several years, and foreman of at least half a dozen of the departments of the plant. He is now at the head of all departments, being assistant to factory manager W. H. Waite.

* * *

The Arcade Rubber Co., which has taken over the store of the Decker Rubber Co., 76 Weybosset street, Providence, is being conducted by the Direct Rubber Co., 47 Pine street, of which Elwyn C. Thayer is treasurer.

John M. Norris, who was employed for many years with the National India Rubber Co. at Bristol, and later as foreman in the calender department of the International Rubber Co. at West Barrington, died at the State hospital at Howard, January 17, after a long illness. He was 53 years of age and a native of Bristol, where he has a wife, two sons and a daughter.

THE RUBBER TRADE IN TRENTON.

By Our Regular Correspondent.

ONE of the most important happenings for a long time in the rubber field of Trenton was the formal reorganization this week of the Empire Rubber and Tire Co., with a capital of \$1,500,000 preferred and \$3,000,000 common stock. The new president, succeeding General C. Edward Murray, is J. E. Baum, president of the Supplee-Biddle Hardware Co., Philadelphia, Pennsylvania, and a director of the Corn Exchange Bank. General Murray still retains a substantial interest in the company, although he disposed of some of his stock at the time of the reorganization. His son, C. Edward Murray, Jr., is vice-president, and his other son, J. Cornell Murray, is treasurer of the company.

Other officers of the new company, not enumerated above, are: E. B. McKay and J. A. Perkins, vice-presidents; A. Boyd Cornell, secretary. The board of directors is made up of J. E. Baum, General C. Edward Murray, J. Cornell Murray, E. B. McKay and F. A. Forbes.

Mr. McKay was for many years Chicago manager of the Empire company. A. Boyd Cornell, the secretary, has also been long identified with the concern. Some of the new capitalists are said to be heavily interested in automobile manufacturing, and this of itself, it is thought, will aid in greater development of the Empire plant. It is expected that the present capacity will be about doubled before the end of the present year.

* * *

Justice Kalisch, of the New Jersey Supreme Court, has handed down an opinion reversing the decision of Judge Marshall, of the Mercer County Court, in the case of Arthur F. Foley, traveling salesman for the Home Rubber Co., who was drowned when the steamer "Lusitania" was torpedoed in May, 1915. Mrs. Foley brought suit for \$3,000 under the workmen's compensation act. An insurance company defended the suit and the Home Rubber Co. was not a party to the action. Judge Marshall decided against the widow.

Justice Kalisch, in reversing this decision, sets forth some legal facts which will doubtless be of interest to all employers of traveling men. Justice Kalisch says that Judge Marshall's determination of fact was apparently founded upon a misconception of the legal principle applicable to it. The trial judge, he states, appears to have disposed of the facts upon the mistaken notion that in order to hold a master responsible for an injury to his employe as a result of an accident, the accident must be one of which the actual negligence is the natural and proximate cause. It is clear from a plain reading of the statutes, Justice

Kalisch holds, that the question of negligence does not enter into the consideration at all where compensation is sought under section two of the act. It was advanced for the defendants that the torpedoing was something not reasonably to have been anticipated. The rubber company, Justice Kalisch holds, knew that Foley, its agent, was booked upon the "Lusitania" and it was legally bound to take notice that because of a condition of war between Germany and Great Britain, ships might be captured or sunk. Precedents show that if the vessel had been lost through collision, fire or storm, the mishap would have been construed as one arising out of Mr. Foley's employment. The fact that the ship was lost by an extraordinary peril does not make it less an accident arising out of employment. The case will now be placed on schedule for another trial.

* * *

A case of history faking which aroused interest throughout New Jersey and in which the late Frank A. Magowan, one-time rubber king, was the central figure, has just been rectified, much to the satisfaction of his friends. Many years ago Mr. Magowan gave unsparingly of time and money, and was one of the prime movers in a plan to have the Battle of Trenton commemorated by a suitable monument. Finally, after years of effort, Congress agreed to bear part of the expense. Mr. Magowan was appointed a member of the Battle Monument Association, composed of about a dozen prominent men, in charge of the erection of the monument and its care after its completion. No appointments were to be made to fill vacancies caused by death, and following the demise of the last member, the work devolved upon the State. After Mr. Magowan met with reverses some years ago and finally drifted low on the social and financial scale, his name was secretly chiseled from the bronze tablet in the monument and the name of another man substituted. The official picture of the Monument Association was also doctored so that the face and head of another man was placed where that of Mr. Magowan had been. Now, thanks to the work of his son and the efforts of a local newspaper, the wrong has been righted and both name and picture have been restored.

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The Ajax Rubber Co. has increased its capital stock from \$5,000,000 to \$10,000,000.

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W. J. B. Stokes, the rubber manufacturer, has been reelected a director of the Broad Street Bank.

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The newly finished State museum was opened this week in the State House. One of the exhibits is from the United & Globe Rubber Manufacturing Cos. It shows rubber in process of manufacture from a crude state to a finished automobile tire. This firm is erecting a \$1,000 addition to its plant.

* * *

A dinner was recently given by the officers of the Thermoid Rubber Co. in honor of the branch managers of the concern who were in Trenton for an annual conference. Those present were: J. Oliver Stokes, president; W. J. B. Stokes, treasurer; Robert J. Stokes, secretary; Dale O. Pohlman, sales manager; Joseph Liston, Chicago, Illinois; George W. Whittemore, Boston, Massachusetts; L. T. Kuhl and J. W. Pohlman, Indianapolis, Indiana; J. N. Kirk, Jr., New York City; Harold F. Blanchard, Philadelphia, Pennsylvania.

A RUBBER SPONGE PEN-WIPER.

A suggestion for cleaning steel pens, said to be decidedly more efficacious than the ordinary pen-wiper, is to place a rubber sponge, wet with glycerin, in a glass holder, the sponge remaining moist and always ready for use. The ink is absorbed from the pen by contact with the glycerin, a thin layer of which adheres to the pen, preserving it and making it take the ink at once when dipped.

The India Rubber Trade in Great Britain.

By a Special Correspondent.

CONGESTION is general in the rubber trade at the present time in this country, and is especially affecting the fabric proofing industry, which is flooded with goods for rubberizing. The government has obtained cloth too quickly for proofers to handle it. Heavy twills for trench capes are monopolizing the activities of the proofing industry. It is stated that one firm alone is rubberizing from four to five thousand pieces of this fabric weekly and this rate of output promises to continue far into February.

RUBBER FOOTWEAR.

Recent snow storms found retailers quite short in supplies of rubber footwear; most were sold out the first two days of the "slushy" weather, despite the partial relief afforded by American supplies.

MECHANICAL GOODS.

Mechanical rubber goods continue in good demand, and all kinds of molded articles are being sought in large quantities. The scarcity and high cost of leather has greatly increased the demand for rubber and fabric belting. Large orders were recently booked for armored hose for government purposes and great quantities of trench hose are being taken by the armies in France, so that the rubber hose people have their hands full.

ERASERS.

Austrian erasers are being replaced by an American rubber composition which well answers the purpose but wears much faster than pure rubber. These American erasers are sold to dealers on cards of one or two dozens and retail at a half penny (1 cent) each.

DRUGGISTS' SUNDRIES.

The government is purchasing large quantities of fine rubber sheet and it is freely stated that far more could be used than can be produced.

Waterbottles are selling faster than the proverbial hot cakes; so are air cushions, especially those of cheap Japanese makes.

Business in rubber toys and similar materials is very brisk. Celluloid is scarce and a tough quality of china is being substituted for it by London doll manufacturers.

A large Christmas business was done in rubber-lined ties. Their great merit lies in the fact that the rubber prevents creasing, and the application of a hot iron rapidly restores the tie to something approaching its original freshness.

PATENT VULCANIZATION ACCELERATORS.

The use of any means for saving either time or labor is of vast importance to our rubber industry at the present time. The North British Rubber Co., Limited, of Edinburgh, recently applied in the Patents Court for Board of Trade license to use four German patents by the Bayer Co., of Germany, for an accelerating process in the vulcanization of rubber in which piperidine or its homologues are active elements. The Board of Trade has not yet decided the terms on which the license will be granted.

NORTH BRITISH RUBBER CO. EXTENSIONS.

The demand for this company's tires has been such since the outbreak of the war that it has been found necessary almost to double the extensive tire making plant. The present department has been working night and day without cessation, but has proved altogether inadequate to meet the rapidly increasing demand since the outbreak of the war.

RUBBER AND POTTERY.

A direction in which there may be scope for increased use of rubber is the direct printing of pottery in one or more colors. The great obstacle to printing pottery has been that

it cannot be flattened like a flexible sheet of paper. If it is to be printed upon directly, it must be with the aid of some flexible, durable material that can be made to take the same shape as the pottery, that can be spread out flat to receive a coat of color from a roller, and that will, when pressed on the ware, leave a print; all qualities which rubber possesses to a marked degree. But, unfortunately, rubber stamping does not produce high-class work, even on paper, while on pottery it is even less satisfactory, except perhaps in the case of gold stamping, which it makes very clear, provided the design be simple.

At a recent meeting of the English Ceramic Society, however, W. Sherratt described a new development which may lead to a revolution in methods of direct printing on pottery.

Mr. Sherratt claims that rubber can now be prepared which will print equal to copper plate printing, and that the way is, therefore, cleared for a direct printing machine. He also claims that a machine has been devised for holding the improved rubber, for applying a coat of color to it, for shaping it to the object and printing on the pottery, and for drawing it away again to receive more color. The mechanism of this almost human device is said to be very complicated.

The machine will print up to 60 dozen articles in an hour (not counting any time for stoppages), and can be driven by a small electric motor of 1 horse power. Samples of ware printed by this system were exhibited.

THE SITUATION IN SCANDINAVIA.

By Our Regular Correspondent.

CONDITIONS in Scandinavia to-day are in many ways very similar to those in the United States. The demands of the warring nations for practically everything we can produce have caused prices to rise rapidly and many persons have profited thereby. The purchasing power of our people was never so great as it is now, and the rubber trade and industry are profiting by the prevailing prosperity and comparative freedom from foreign competition.

True, the restrictions of the British Government on rubber shipments are bearing heavily on both manufacturers and consumers of rubber goods, but this has not prevented the industry from experiencing unprecedented prosperity and development in all of its branches. The population of Scandinavia has been greatly increased by German refugees, money is circulating as never before, and our rubber manufacturers are getting "their prices" for all the goods they can turn out. No rubber goods are being exported, the home markets alone are more than our manufacturers can supply.

RUBBER FOOTWEAR.

As prior to the war, footwear is the chief item of our rubber manufacturers, but other branches of the industry have grown immensely and the scarcity of raw materials alone has prevented even more extraordinary development.

Automobile tires, that formerly were practically all imported, are now being produced in quantities that are immense when compared with what were being produced prior to the war.

INSULATED WIRES AND CABLES.

The high cost and scarcity of coal that has been general in Scandinavia since the outbreak of the war has caused rapid development of the wonderful water power of our mountains. Electric power plants have rapidly increased, especially in Norway. The result of this is that the demand for insulated wires

and cables is greater than ever before. In fact, the demand is so large that, despite the large capacity of domestic factories, which have more than doubled their output, almost a million dollars' worth of electric cables were imported into Norway alone during the year 1916.

RUBBER FACTORIES.

Scandinavian rubber factories are now up to date in every sense, and very large, though, of course, we make no attempt to compare them with the gigantic rubber factories of America. Our plants have grown immensely both in capacity and in efficiency during the past two years, and when peace is reestablished, foreign manufacturers, who now complain of the difficulties in the way of international trade, will hardly find their Scandinavian business better than it is under present conditions. Their tire business, however, will probably be an exception to this rule, for the automobile tires, both solids and pneumatics, that are now being produced in Scandinavia leave much to be desired and must be greatly improved if they are to compete successfully with good foreign products. In other lines, however, our manufacturers will not have to fear foreign competition, for they have learned to satisfy practically all of our requirements, even under the difficult conditions now prevailing. With ample supplies of raw materials they will probably be able even to enter the export field themselves.

HEADS TRAINED ABROAD.

Most of the managers, chemists, superintendents, and also many of the salesmen employed by Scandinavian rubber factories are men who have gained most valuable experience in schools, factories and business in America, England, Germany and France. Since the outbreak of the war, numbers of Scandinavians, who held responsible positions in various foreign countries, have returned to their native lands and are applying the most approved modern methods in our rubber and cable factories.

BRITISH RESTRICTIONS.

Besides curtailing the development of our rubber industry, the British restrictions on rubber shipments, coupled with the shortage of ocean tonnage, have seriously interfered with the automobile business which is so closely related to the rubber industry.

Only a few cars are produced in Scandinavia; practically all are imported and, since the war, there has been an increasing demand which is supplied chiefly by American companies. American cars arrive here without tires and, before a set of tires can be obtained for one of them, an old set must be turned in, which means that some other car must be put out of commission, or a number of cars deprived of their spare tubes and casings. All tires imported here must pass through London, and the strictest kind of supervision is exercised by both British and Scandinavian authorities to prevent tires or, in fact, rubber in any form, from reaching Germany.

The attitude of the people towards these vexations varies from one country to another, according to interests involved. In Sweden, where German refugees are far more numerous than in Norway or Denmark, and where the bulk of the trade is with Germans and Germany, the feeling created is hostile to the British action. It is argued that the export embargoes all Scandinavian governments have placed on all goods containing rubber should be sufficient guaranty for England, and that, consequently, the British restrictions are not justified.

In Norway and in Denmark, the opinions, as well as the interests of the people, lead them to feel that what is best for England is, in the long run, best for them. Despite all the Scandinavian export embargoes, considerable rubber has been smuggled into Germany at very big profit, and it was in order to check this that Great Britain, in accord with the several Scandinavian countries, developed the system which is now an obstacle to the sale of American cars in Scandinavia, and by which no one can buy a new tire without turning in an old one.

A contemplated visit in the near future to all the rubber factories in Scandinavia will soon result in a series of letters devoted to the various plants in Norway, Sweden and Denmark.

THE LYONS SAMPLE FAIR.

The Sample Fair, which occurs annually in Lyons, France, will be held from March 1 to March 15. Last year this fair, which is the successor of the heretofore great Leipzig Fair (now closed to the world because of the war), had 1,342 different exhibitors, representing manufacturers of the following countries: France, Italy, Great Britain, Canada, Russia, Spain, Portugal and the Orient, and a very large attendance of wholesale buyers from all over the world.

At that fair not an American manufacturer made an exhibit. Business to the amount of \$10,000,000 was transacted, and over \$8,000,000 more was offered, but refused because of the inability of manufacturers to make deliveries. An American committee, headed by George B. Van Cleve, of New York, organized by Mr. Piexotto, president of the American Chamber of Commerce in Paris, and comprising presidents of the chambers of commerce of the principal cities in this country, is endeavoring to have American manufactures well represented at the coming fair, which will be visited by wholesale buyers from Europe, the Orient and South America. It is estimated that their orders will aggregate \$40,000,000 to \$50,000,000.

CORK RIVALS RUBBER FOR WATERPROOFING IN FRANCE.

The French government recently placed orders for hospital sheetings and similar articles manufactured by a new method of proofing materials with cork, which is said also to give satisfaction for featherweight garments. It is waterproof, a non-conductor of heat and unbreakable. A special machine produces very thin veneer of an even thickness from black cork. The veneer is placed in chemical baths in order to remove the resinous parts, which render cork a more or less brittle substance. After this treatment the cork veneer becomes quite flexible, and compares favorably in this respect with thin leather. In fact the sheets can be folded and bent without breaking.

By combining the cork sheets with any suitable cloth, preferably a thin and strong cloth of good color, an excellent waterproof material is obtained. An adhesive preparation is used to cement the cork to the cloth; or, if a stronger garment is desired, the cork sheets are placed between two layers of cloth.

Fabric prepared in this manner is said to have a decided advantage over ordinary waterproof materials, because it is porous, permitting ventilation where the ordinary waterproofing prevents it. Of course the cork is very light, and an aviator's coat made of this combination is said to be the lightest on the market.

THE RUBBER TRADE IN JAPAN.

By a Special Correspondent.

IMPORTS OF CRUDE RUBBER.

THE Japanese importation of crude rubber during the last year was estimated to be 3,903,552 pounds [\$1,715,796.50], and showed 1,595,771 pounds [\$642,479.50] increase over that of the previous year.

This increase is the result of the great demand for rubber goods, and the new factories organized to meet this demand, among them Futaba, Minatogawa and Ishiyakawa have their plants near Osaka. In Tokio eight new factories were established, and other old companies enlarged their capacities to help fill the shortage caused by the war.

As the number of manufacturers increases, the price of the manufactured goods goes down. For instance, a few years ago a pair of bicycle tires cost from \$2.50 to \$3, but now the price is only about 90 cents a pair.

Factories in Tokio or Osaka received orders for 60,000 pairs of

tires for exportation. Before the war tires for rickshaws for use in China and other eastern colonies, were imported from Germany, but for the last two years Japanese tires have taken the place of those of German make.

Certain companies in Japan had special orders from England for automobile tires, and it is estimated that they made ten times as many as they had expected. The manufacturers at present want more orders for exportation than for the home market, for the domestic price has been low for some time. Previously crude rubber was imported from Singapore, but after the prevention of exportation, most of the raw material came from Ceylon. This Ceylon rubber is said to be superior in quality to that of Singapore, but as the price is a great deal higher, and as it takes a longer time for transportation, the manufacturers prefer to import their material from Singapore, and in some way, despite the law, they have succeeded in obtaining material from there since last April.

Until the beginning of the war no rubber was imported from Hawaii, but when the exportation from Singapore was stopped, the manufacturers obtained some raw material from there. Now that rubber is again being imported from Singapore, the manufacturers get very little from Hawaii, although the rubber goods business depends largely on this small supply, and would be seriously injured if it were stopped, even temporarily.

The finer quality of rubber required for certain goods is imported from England. A few of the manufacturers get this finer material from the United States, but as it is a good deal more expensive than the English material, the majority of them prefer the English market.

THE EXPORTATION OF TIRES.

The exportation of tires for last year amounted to 2,486,569½ pounds [\$1,706,314.50], showing an increase of 1,630,177½ pounds [\$1,663,179.50] over that of the preceding year. Until the war began, European and American tires were used principally, but since then the Japanese manufacturers have had to supply them. At present orders from Russia are pouring in, and the export for Russia this year is far in advance of other years. The exportation of rickshaw tires makes up one-half of the whole amount. These are made mostly by the Dunlop, the Oriental Rubber, the Mitatsuchi and the Nippon rubber companies.

Automobile tires are manufactured mainly by the Kakinchi and the Dunlop companies. The sizes of these tires differ according to the countries from which the orders come. Sometimes the manufacturers have to use meters instead of inches, and on this account the work is rather complicated. The average sizes, though, vary between 28 by 3 and 35 by 5. Manufacturers are also receiving large orders for solid tires, and the demand for these, as well as for the others, is rapidly increasing.

ECONOMIC ADVANTAGES.

From an economic standpoint the Japanese unquestionably hold certain advantages in the rubber industry of the world. They are a frugal people, practicing every possible economy, so that wages and the cost of living are remarkably low. Women occupy about 75 per cent of the positions in labor, both in factories and agriculture. As employed at hand-made tires they receive from 12½ cents to 24 cents per day of 12 hours. The highest wage paid to male superintendents and foremen is 64 cents, whereas the average workman receives only 25 cents per day. This in large measure explains the surprisingly low prices at which rubber goods of Japanese manufacture are obtainable here.

PICTURESQUE JAPANESE ADVERTISING.

That Japanese manufacturers appreciate fully the power of attraction of illustrations in their advertising is indicated by the accompanying reproduction from a page in "The Gomu-Sekai," the Japanese rubber trade paper. This striking design heads the



advertisement of druggists' sundries of Skinjiro Muneta, 20, Nichome, Doshomachi, Higachiku, Osaka.

SIAM'S IMPORTS OF RUBBER GOODS.

ACCORDING to American consular advices, Siam's imports of rubber goods for the last three fiscal years ended March 31, 1916, have shown the following variation: 159,115 pounds, valued at \$119,507, for 1914; 143,506 pounds, valued at \$103,702 for 1915; and 157,931 pounds, valued at \$127,507, for 1916. The imports for 1916 included 58,565 pounds of automobile tires, valued at \$51,978; 13,380 pounds of cycle tires, valued at \$14,551; 41,323 pounds of other kinds of tires, valued at \$16,795; and 44,630 pounds of all other rubber manufactures valued at \$44,183.

SOURCES OF IMPORTS.

The sources of rubber goods imports for the fiscal year ended March 31, 1916, were: From the United Kingdom, automobile tires, \$39,902; cycle tires, \$4,941; other kinds of tires, \$12,771; and all other rubber manufactures, \$11,155. From United States, motor car tires, \$872; cycle tires, \$3; all other kinds of tires, \$134; and all other manufactures of rubber, \$1,002. From Italy, cycle tires, \$395. From Japan, tires, \$17; and all other rubber manufactures, \$2,584. From Singapore, automobile tires, \$39,902; cycle tires, \$9,011; all other kinds of tires, \$3,873; and all other rubber manufactures, \$27,791. From all other countries, \$1,651 worth of rubber manufactures other than tires.

Taking the totals of all rubber goods imported during the fiscal year ended March 31, 1916, it will be noted that \$80,591 worth is credited to Singapore, a British port of transshipment; \$40,226 to the United Kingdom; \$2,011 to the United States; and \$4,448 worth to all other countries.

TIRE MARKET.

The roads in and around Bangkok, the capital of Siam, are favorable to the use of rubber-tired vehicles, and the use of the automobile and bicycle is steadily increasing. The total number of motor cars on the register up to April 1, 1916, was 875. Rubber tires are used for horse-drawn vehicles, as well as for the rickshaws drawn by the Chinese coolies.

During past years American manufacturers apparently have not displayed any active interest in Siam's needs for rubber goods, but in 1916 an American concern established an agency for its automobile and other tires, and American salesmen are said to have taken fair orders for other kinds of rubber goods.

The import duty on all kinds of rubber goods is 3 per cent ad valorem.

BELGIAN CONGO RUBBER EXPORTS.

The latest available statistics of the foreign trade of the Belgian Congo are for the year 1915 and show that exports of crude rubber amounted to 4,428,945 pounds, against 4,892,166 pounds exported the previous year.

Rubber Planting Notes.

RUBBER TAXATION IN THE FEDERATED MALAY STATES.

ACCORDING to recent advices from the Far East, there is in Malaya considerable agitation with the object of adding still further to the export duty on crude rubber.

At the present time the export duty is $2\frac{1}{2}$ per cent ad valorem. It is suggested that at the next Federal Council of the Federated Malay States a motion may be introduced to provide for an additional export duty of one Straits Settlements dollar per picul [\$0.567 per 133 $\frac{1}{3}$ pounds] to be levied upon all crude rubber exported during the year 1917. In fact, there are rumors of a still higher tax being imposed.

STRAITS SETTLEMENTS RUBBER INDUSTRY AND TRADE.

The American Consul at Singapore, Straits Settlements, reports that the development of the rubber industry in the Malay Peninsula has seriously affected the cultivation of most of the other agricultural products of the country. The cultivation of rice, for instance, was first supplanted in large areas by cocoanuts and later by rubber. From the cultivation of rice the native was able to work out a bare livelihood, but with a small rubber plantation he has the possibility of becoming in a few years a comparatively rich man.

There were imported in 1915, 23,114 tons of crude rubber from the Malay States, 2,198 tons from the Netherlands Indies, and 709 tons from other countries. The figures in 1914 were 9,661 tons, 556 tons, and 274 tons; and 4,073 tons, 188 tons, and 189 tons in 1913.

The exports of crude rubber from the Straits Settlements in 1915 are given as 12,824 tons (value \$13,744,621) to the United Kingdom; 21,075 tons (value \$25,598,597) to the United States, and 4,383 tons (value \$1,776,367) to other countries. In 1914 they totaled 13,376 tons, 4,510 tons, and 2,220 tons, with 7,168 tons, 2,508 tons, and 731 tons, the corresponding figures in 1913.

INCREASED RUBBER EXPORTS FROM SUMATRA.

The American consul at Batavia, Java, reports that exports of plantation rubber from Belawan, Deli (Sumatra), for the first eight months of 1916 amounted to 19,947,704 pounds, compared with 8,300,817 pounds in the corresponding period of 1915. Shipments to the United States increased from 2,309,072 to 5,549,025 pounds. This indicates continued growth in the trade with the United States, which had previously leaped from 67,200 pounds in 1914 to 4,074,560 for the entire year 1916. The figures for eight months are:

Countries	1915.	1916.
United States	2,309,072	5,549,025
Great Britain	12,174,400	8,863,988
Netherlands	948,138	31,592
Straits Settlements	466,158	1,503,999
Total	8,300,817	19,947,704

DUTCH EAST INDIES RUBBER TRADE.

The latest complete official reports on the rubber trade and industry in the Netherlands East Indies now available are for the calendar year 1915.

As has already been stated in THE INDIA RUBBER WORLD, in consequence of the trouble experienced in shipping merchandise to the United States via the Netherlands at the beginning of the war, all goods from Sumatran ports to the United States in 1915 were shipped either via Java by direct steamer to New York, or via Singapore and Hong Kong to San Francisco and Seattle.

The direct monthly service to the east coast of the United States being found insufficient to meet the increasing demand

for cargo space, was changed to one of three weeks, and still all boats sailed with all the cargo they possibly could carry. Freight rates to New York had increased about 50 per cent by the close of the year, and shippers found that they could send their goods to American Atlantic ports via San Francisco and rail at less expense than by sending by direct steamer from Java to New York.

EXPORTS FROM JAVA.

Of the total crude rubber exports amounting to 14,262,235 pounds, 4,732,264 pounds went to the United Kingdom, 2,831,748 pounds to the Netherlands, 1,024,423 pounds to the Straits Settlements, and 11,000 pounds to France.

Exports of gutta percha amounted to 678,269 pounds; all went to the Netherlands, as did also the exports of gutta jelutong, which amounted to 1,584 pounds.

EXPORTS TO THE UNITED STATES.

Exports of crude rubber to the United States in 1915 amounted in value to \$5,918,570, against \$338,315 in 1914; those of gutta jelutong amounted to \$45,353, against \$4,969 the previous year, and exports of gutta percha were valued at \$31,533 against \$10,007 in 1914.

RUBBER CULTIVATION IN THE NETHERLANDS INDIES.

A report of the International Association for Rubber Cultivation in the Netherlands Indies estimates the total area under rubber in the islands of Sumatra and Java at 570,000 acres, about half of the total capital involved being English, the Dutch interest coming next, while France, Belgium and the United States are represented in the balance. The export of crude rubber from the Dutch possessions for 1915 is given at 18,765 metric tons, of which 11,307 tons came from Sumatra and 7,458 tons from Java. In 1914 the total export was 10,046 tons, of which 6,234 tons came from Sumatra and 3,812 tons from Java. This illustrates the rapid growth of the industry in recent years, and in the case of plantations on the east coast of Sumatra the development of the estates would appear to have been particularly rapid.

CEARA RUBBER FROM NIGERIA.

Reporting on two samples of *Manihot* rubber received from government plantations in Nigeria for analysis and tests, the British Imperial Institute states that the first sample had been prepared by a native from trees three years old, having an average girth of 15 inches at 3 feet from the ground. Sixty trees were tapped 14 times during a period of one month, the total yield of dry rubber being 118 ounces. The rubber was dark brown and in the form of thin, rough sheets. It was in good condition, containing only a small amount of impurities in the form of bark. Its physical properties were quite satisfactory.

The results of chemical examination were as follows:

Loss on washing (moisture and impurities)	Per cent.	5.3
Composition of dry washed rubber:		
Caoutchouc	83.1	
Resin	5.3	
Protein	9.9	
Ash	1.7	

The sample was valued at 2s. 1d. per pound in London, with fine hard Para at 2s. 6 $\frac{3}{4}$ d. per pound, and dark-brown plantation Para crêpe at 2s. 4d. per pound.

The rubber, although derived from young trees, compared favorably in composition with many samples of Ceara rubber previously examined by the Imperial Institute.

The second sample had been obtained from 96 trees which were tapped 26 times during the months of May and October.

During the intervening four months the trees were allowed to rest. They were from three to four years old and varied in girth from 18 to 20 inches at 3 feet from the ground, the majority being about 20 inches. Half of the trees had been tapped during the previous year, but the remainder were being tapped for the first time.

The sample consisted of rough sheet rubber, in pieces measuring about 5 inches square. The color varied from pale to dark brown, but many of the pieces were whitish on the surface. The physical properties of the rubber were good.

A chemical examination gave the following results:

Loss on washing (moisture and impurities).....	Per cent..	8.0
Composition of dry washed rubber:		
Caoutchouc		84.7
Resin		6.3
Protein		7.7
Ash		1.3

The rubber was valued at 2s. 6d. per pound in London (April 3, 1916), with plantation Ceara crêpe at 3s. 2d. per pound and plantation Para crêpe at 3s. 2d. per pound.

This latter sample was also satisfactory in composition. In both cases the amounts of resin and protein were not excessive for *Manihot* rubber, but the loss on washing was rather high.

RUBBER PLANTING IN THE MADRAS REGION OF INDIA.

The Madras Presidency at the present time is the most productive rubber region of British India. The area under rubber cultivation in that Presidency is 12,922 acres, and the number of *Hevea* trees is estimated at 1,636,476. The only other important rubber-producing regions of India are Assam, with 4,681 acres and 137,430 trees, and Burma, with 29,544 acres and 4,011,399 trees. The yield of the Assam plantations is relatively small, but is increasing steadily. The output of crude rubber in Madras in 1913 was more than double that of Burma, where most of the trees have not yet reached a tappable age. Practically all *Hevea* is "stump-planted," stumps being obtained from nursery trees from 9 to 12 months old. At the average rate of development of plantation *Hevea* in India, trees become tappable about four years from the date of stump-planting.

The American consul at Madras reports that in 1915 the United States purchased crude rubber for the first time from India direct, the quantity purchased amounting in value to \$110,035. The exports from the Madras Presidency to all countries showed in the fiscal year 1915-16 an expansion of 50 per cent in quantity, while the value increased 31 per cent. The average value declined from \$99 to \$88 per hundredweight. Shipments to the United Kingdom and Ceylon increased from \$1,675,090 to \$2,065,018, and from \$688,448 to \$937,612, respectively.

The following table shows the quantities and values of exports, with average price per pound, for the last four fiscal years:

Year.	Quantity in Pounds.	Total Value in U. S. Currency.	Value Per Pound in U. S. Currency.
1912-13	888,800	\$1,323,139	\$0.08
1913-14	1,595,900	1,989,101	0.07
1914-15	2,388,600	2,367,714	0.06
1915-16	3,559,300	3,113,262	0.05

RUBBER THEFTS IN THE FAR EAST.

Far Eastern exchanges contain many items relating to thefts of both crude rubber and latex. These thefts appear to be increasing each day, but this is not surprising when one considers the tremendous growth of the rubber-producing industry in that part of the world. In Malaya the records show that the courts are imposing exemplary punishment on rubber thieves, and it appears that the government is seeking to devise a system that will effectively check rubber stealing.

Mr. Pearson's book "What I Saw in the Tropics" will interest every rubber man who aspires to know more about crude rubber production. Price, \$3.

MAURITIUS RUBBER IMPORTS.

Mauritius, the prosperous little British island of the South Indian Ocean, has about 382,740 inhabitants, of which 261,093 are Indians, who make up the laboring element; the balance of the population being composed of Mauritian descendants of the former French and Dutch settlers, and Britishers. The sugar industry is the economic and commercial mainstay of the colony; other products are aloe fiber, manioc, maize, tea, vanilla, coffee, fruits, vegetables, etc.

Official statistics for 1915 show that, besides wearing apparel containing rubber, Mauritius imported \$54,723 of rubber articles, against \$42,442 the previous year.

HEVEA PLANTING IN THE FIJI ISLANDS.

The latest available official reports regarding the rubber plantation industry in the Fiji Islands are for the year 1914.

Rubber planting is still in an experimental stage there. *Hevea* trees from seedlings planted in 1906 at a distance of 17 by 17 feet had attained in 1914 an average girth of 17.1 inches at 3 feet from the ground. Thirty trees tapped about 170 days (in all 4,970 tappings) yielded 22½ pounds of smoked biscuits and 6½ pounds of scrap. Seedlings planted in 1908 attained a girth of 11.4 inches and stumps planted the same year a girth of 11.1 inches; in each case at a height of 3 feet from the ground. In most cases the plots had suffered much from storms.

RUBBER IN UGANDA.

The *Hevea* rubber crop was next in importance to coffee on plantations in Uganda during the fiscal year, 1915-16, according to a report recently published by the Department of Agriculture of the Government of that British colony.

The area under rubber plantation was divided up as follows: 1,072 acres over five years old and 328 acres under five years. In addition to this 4,506 acres over two years old and 238 acres below that age were interplanted with coffee, making a total of 6,144 acres under *Hevea* on regular plantations. Besides these plantation areas, it was estimated that the natives had 1,062 acres under *Hevea* and 2,273 acres under Ceara (*Manihot*) rubber; while the several religious missions had 169 acres of *Hevea* and 121 acres of other rubber.

A comparatively small area had reached the tapping stage, but the exports were rising gradually, being 52,349 pounds in 1915-16 compared with 22,056 pounds in the previous fiscal year.

The output suffered but little from pests and diseases, the small shipments of plantation rubber made realized good prices, so that it is conservative to state that rubber promises to become of considerable importance in the agricultural development of Uganda.

THE RUBBER TRADE IN MALAYA.

By Our Regular Correspondent.

ALL talk in local rubber circles is chiefly concerned with the projected "American invasion." As mentioned in previous articles, American capitalists are taking a lively interest in the Malayan rubber industry, an interest which promises to develop very speedily into active participation in production, and this on a very big scale. Matters have already progressed so far as to justify mention in the realms of government. Speaking at a recent meeting of the federal council of Malaya, Sir Arthur Young, G. C. M. G., who, besides being governor of the Straits Settlements, is the high commissioner of the Federated Malay States, said: "With reference to what has been termed the American invasion I understand that the large company in question do not wish to have land alienated to them. They have no desire to lead to over-production. They want to purchase land already alienated, and, first of all, they wish to find out whether the planters want them to come here or not. It is for the planters to say. There is no law to stop land being sold to Americans."

It is only natural that when the news of this large company's proposed activities became noised abroad among the planting community it had rather a mixed reception. The first impulse was to resent an apparent intrusion on what might be termed "our own preserves," but second thoughts led to a change of view, and now it can be said with confidence that the United States' entry into the great industry of Malaya will be generally welcomed by all in any way connected with it. It is recognized that the putting of capital into a country, while furthering the ends of the capitalists, cannot fail also to increase the prosperity of the country concerned. I have heard it said that planter antagonism to the American invasion is based on fear of "American methods," but this surely is a childish view to take. If, say others, the Americans have anything to teach us in the art of profitably administering our properties, let us learn it all as quickly as possible, for these be days when we need to get the best possible results from all of our possessions. If our methods are as good as any that can be imported, they are not likely to be disturbed, for the newcomers are hardly likely to want change just for the sake of change.

As regards the risk of over-production, if quantities of new capital are introduced, there is no need to tell anyone connected with the trade that the demand for rubber is increasing by such leaps and bounds that any such fears need not be entertained for a moment. It is even possible that there may come again a period of such scarcity as was experienced some ten years ago. There are now trades to which rubber is so essential, and that in vast quantities, that those who have sunk capital in such businesses, feel the necessity of taking a direct interest in the production of the raw material. For one thing in particular they are naturally anxious not to be entirely at the mercy of the market—and the market price—in the matter of supplies. The present time, too, is considered particularly opportune for coming in for the simple reason that the bulk of rubber plantation capital is held in Great Britain, and as the war goes on it will be increasingly difficult to find the money to develop the large number of estates, which are still in need of development. With new British capital for the industry diminishing, there should certainly be companies willing to sell their properties or give part share in them rather than see them run to weed.

On the British side it is asked: Is it desirable to let foreigners get a big hold on our plantations? In the ordinary way the answer would be no, but in a case where it is necessary to sell, then America is the place to which to look for good prices. In fact, in the present condition of world politics, it is the only place to look to, seeing that Germany does not count, and that other allied nations have no spare capital to invest in foreign ventures. Then, from the point of view of the general interest of the country itself, any development of the land is to be welcomed. There are thousands and thousands of acres of rich land awaiting development, and only outside assistance can make this possible as it is obvious that for years after war is over the burden of taxation will prevent a large volume of British capital being available for colonial purposes. It is not likely that in such circumstances Britain will run the risk of detriment to the territories under her care by raising obstacles to foreign capital. Without help the colonies will decline, but by accepting it both Great Britain and those who assist will benefit. From all points of view, then, the promised "American invasion" of Malaya is to be heartily welcomed.

Recent company reports indicate that, while practically all estates are showing steady and substantial profits, directors are being more cautious than ever in the matter of making large allocations to reserve. It is expected that war taxes on profits are to be made heavier still, and when the pressure of war conditions is becoming heavier every day, companies have to be prepared for almost any calls. As regards the thriving nature of the industry, nothing is more significant than the way in

which cocoanut companies are abandoning that product in favor of rubber. Only three or four years ago there was great talk of a boom in cocoanuts, a boom that was to outrival that in rubber of a few years previous. "The consols of the East" was one expressive phrase used to describe the new industry, and a good deal of money was put into cocoanut estates in various parts of the peninsula. But the boom has not eventuated. For some reason cocoanut cultivation does not prove a general success. Various causes hinder the development of estates, and speculators are finding that they will have to wait a long time for the big profits promised. So now rubber trees are replacing cocoanut trees in a good many cases.

ANOTHER VIEW OF THE AMERICAN INVASION.

ALL rubber men do not hold the opinion of the correspondent of THE INDIA RUBBER WORLD on this matter, however. Discussing the tendency of the "wise men of the West" to acquire land on British soil in Malaya—and plant rubber in competition with British planters already established there, our English contemporary "Tropical Life" states the drawbacks of such a tendency from the point of view of many British planters.

Firstly, it would further increase the output of raw rubber by outsiders, who cannot do so well elsewhere, when we British planters are already threatened with a surplus in the near future as it is. Secondly, as the manufacturers are at the back of the move, they can only be after producing their own supplies, or a portion of them, thereby reducing their competition for our output.

Regarding the viewpoint of the American manufacturer who is striving to protect himself from the raids in the form of rubber booms made upon his legitimate business, our English contemporary continues:

But how is the American manufacturer proposing to protect his interests? Is it not at the expense of our own by coming to British Malaya to plant rubber against our own planters after having watched them all these years risking and losing money, health and even lives in establishing the industry and showing how it can be carried on with safety to pocket and person.

Lastly, but most important of all, there is the question of native labor supplies. From what source will the Americans draw their requirements; from British India and elsewhere within our Empire, when the great question of the day is to know how the British-owned estates, sugar, cacao, etc., will do five or ten years hence, when India keeps her labor to herself and our own areas have been largely increased as they must be if the world is not to run short?

We have no feelings but those of good will towards our American cousins, so long as they are not hyphenated ones; but knowing as we do what a large proportion of German blood there is in the so-called American hustlers now overflowing into the world. South America, British territory and elsewhere, we feel, therefore, before we set up and allow outsiders to grow fat at our expense, now *we* have proved that *they* can do so, that we ought first to consider what harm can befall our planters by doing so; and secondly, and above all, let us analyze the constitution of the companies and of the syndicates that are proposing to invade and exploit British Malaya at our cost. The wisdom of allowing genuine Anglo-Saxon Americans to settle in Malaya is doubtful, but it would be worse than wicked to feed Germany and Austria through the United States, as we may do by such an action. Even from the competitive point of view it would be bad to take the backbone out of the New York orders by allowing American manufacturers to settle in British territory to produce a portion of their supplies; but if, hidden behind the cosmopolitan back of Uncle Sam, we must feed Germany and Austria as well and spoil their future demand for our plantation rubber also, it would not only be wicked, but downright suicidal for British interests won at so much cost to British subjects.

As already said, we have nothing but good will towards the genuine inhabitants of the United States, who, we know, are well disposed towards us. Even in their case, however, we believe in the saying that "Charity begins at home," and as America is so extremely wealthy, Uncle Sam can well afford to continue to buy our rubber, as he has been doing, instead of coming in to produce rubber to reduce his competition as a buyer in the world's markets.

FIGHTING THE LEAF DISEASE IN DUTCH GUIANA.

IN his report on the South American leaf disease (as briefed in THE INDIA RUBBER WORLD, September 1, 1916, page 689), Mr. Bancroft recommends spraying with a solution of sulphate of copper in lime water. He also advocates the destruction, by burying or burning, of all fallen leaves.

A preliminary report of Dr. G. Stahel, Government Mycologist of Dutch Guiana, has been made which takes a somewhat dissimilar view of the efficacy of spraying, and recommends radically different treatment for eradicating the disease.

Dr. Stahel has completed his investigations, but the Board of Agriculture is delaying the full report until drawings and photographs, which are to be reproduced in Holland, are available. However, the preliminary report has been published in order that practical work may not be further delayed. This report is as follows:

The disease is attributable to a fungus of three fructifications. The main fructification, *i. e.*, the perithicium, is found on the old leaves, in one to two months at its earliest and before they are matured.

The pycnidium fructifications are always observable on the matured leaves; after two months the perithicium always predominates and is always to be found on the leaves.

The scoliotrichum conidium buds in water in about two hours; if sowed on young leaves, it will be found that after ten hours, a large percentage of the germ-tubes collect under the cuticle, and after 20 hours they will penetrate between the epidermis cells into the leaves and branches.

Drying the conidium, they will die out after 15 hours. The pycnosporous bud in water and in nourishing solution, after a few hours, but the general germ-cell does not exceed two to three micron in length.

Sowed on very young leaves, the germ-cell will not develop further.

The ascospores bud in about the same period as the scoliotrichum-conidium sowed on young leaves. It will be found under the cuticle after 12 hours, very few, single and short germ cells, but after 20 to 22 hours these germ cells will be found far thinner than the scoliotrichum, although grown a little further under the cuticle, but not penetrated in the leaves between the epidermis cell; if the spores are dried out they die in a few hours. The production, however, of ascospores is further very limited, even when the leaves are well supplied with much perithicia, but few on some of the trees that I could obtain for my investigation.

The ascospores will, therefore, contribute very little in spreading the disease. The matured leaves, which so far only bear perithicia are consequently not very dangerous.

It is, however, with the young and matured leaves quite different; these produce a large quantity of scolico. We have found in *Hevea* fields trees that were withering during the whole year, or trees which were forming young sprouts invested with scoliotrichum fructifications. In view of these facts we have come to the following conclusions:

Care should be taken during three to four weeks that the cultivations be kept free from all young *Hevea* leaves, and it will be found that all scoliotrichum fructifications will disappear and also the conidium within 24 hours. The scoliotrichum fructifications will appear again, however, at a later period, and will spread, if the ascospores be not effectively made harmless. It will be necessary, therefore, from time to time to repeat the treatment; but experience will teach in the interval between each treatment.

It is obvious in these treatments that the neighboring plantations follow suit, or in the event of unwillingness on the part of the neighbors to do so the *Hevea* trees should then be removed from the fields.

As the leaves of the *Hevea* always form in a cluster from, say, eight to ten, close upon each other, at the end of the branches, they can be cut off very easily with the aid of a cocoa knife, which is to be highly recommended.

For instance, during the dry season, when the latex is not flowing sufficiently, the laborers can be divided for a few weeks and put to work in the *Hevea* fields to destroy all the young leaves, especially at certain times, when only small portions of the trees are wintering or producing new sprouts. A laborer can treat two large or three small ones in a day of eight hours.

Whether this mode of fighting the disease in Dutch Guiana will prove effectual if continued is hard to say, or whether it

would be better to substitute the *Hevea* in the coffee fields by coffeemama trees I refrain from discussing.

Until recently I have overvalued the significance of ascospores for spreading the disease; only by the latest investigations during the last two months it has proven to me that the infective power of the ascospores can be insignificant, and only in view of these results could I recommend a method which, to my idea, will prove technically adequate.

A few weeks back an article appeared in one of the local papers to the effect that in British Guiana something had been effected towards the eradicating of the disease, and in consequence I am obliged to mention something in connection with the system employed in that colony.

It is recommended by the Government botanist in that colony that spraying the young leaves with Bordeaux mixture and cutting off the dried branches from the healthy parts and destroying the fallen leaves will be found to help remove the disease; to this I will say dead fungus does not do any harm. But the cutting of the dry branches from the healthy part is based on the fact of my investigation and which I cannot even recommend. I have, therefore, advised a few plantation owners where the system has been carried on not to continue it; the reason of this will appear in the Bulletin.

Spraying of the trees with Bordeaux mixture will, when applied on leaves two to four days old prove favorable, but the application appears to me for various reasons to be unfit; in the first place, it is expensive and not so beneficial as my proposed method.

Proofs are also shown here that the young leaves of one to three centimeters cannot bear the spraying with Bordeaux mixture, and will curl and fall off. This fact has also been proved on the Sloopwijk plantation during the fighting experiments.

It will thus be seen that these two investigators are widely at variance regarding the methods necessary to overcome this disease. However, we understand that Mr. Bancroft has not yet completed his investigation, and moreover, has since made a visit to Dr. Stahel to consult with him regarding this important matter. It is hoped that as a result of this meeting conclusions will be reached which will be of such character as to provide rubber growers throughout the world with a remedy for this formidable disease.

CRUDE RUBBER IN HONDURAS.

According to the American Consul at Ceiba, Honduras, the crude rubber industry there is dormant. The low prices prevailing in rubber markets, coupled with the export duty levied by the Government of Honduras and the municipalities, amounting at Cuba to approximately 4 cents gold per pound, makes rubber gathering so unprofitable that the natives will not tap the trees even when they can find them close at hand, and traders declare that they buy the product merely as an accommodation.

RUBBER TRADE OF BOLIVIA IN 1915.

According to the statement of the Bolivian Minister of Finance to the 1916 National Congress of Bolivia, the exports of crude rubber, which amounted to 4,484,915 kilograms [9,867,813 pounds] in 1914, reached 5,034,847 kilograms [11,120,663 pounds] during the fiscal year 1915-16.

RUBBER GOODS IMPORTS INTO VENEZUELA.

The American Consul at Maracaibo reports the following imports of rubber manufactures into Venezuela during the years 1914 and 1915:

	Tires.		All other rubber goods,	
	1914	1915	1914	1915
United States	\$1,720	\$5,600	\$1,325	\$7,152
United Kingdom			450	1,200
Germany			1,000	
All countries	\$1,720	\$5,600	\$2,775	\$8,352

CONSULAR INVOICES FOR BRAZILIAN SHIPMENT.

The Brazilian budget law for 1917 provides that no invoices after shipment will be accepted by Brazilian consuls, and shipments unaccompanied by consular invoice pay double duty.

Recent Patents Relating to Rubber.

THE UNITED STATES.

ISSUED DECEMBER 19, 1916.

- N** 1,208,867. Heelless overshoe. C. S. Goodyear, Naugatuck, assignor to The I. Candee & Co., New Haven—both in Connecticut.
- 1,208,869. Rubber-coated closet seat. M. J. Whelan, Muskegon, Mich., assignor to Brunswick-Balke-Collender Co., a corporation of Delaware.
- 1,208,901. Elastic tire. H. E. Boyd, Akron, Ohio.
- 1,208,907. Inner tube for pneumatic tires. J. P. Brophy, Birmingham, Ala.
- 1,208,922. Drenching bottle entirely constructed of rubber. G. Dawkins, Lexington, Pa.
- 1,208,932. Demountable rim. R. A. Eckberg, Des Moines, Iowa.
- 1,208,946. Tire filler. L. G. Gilghrist, Vandergrift, Pa.
- 1,208,948. Spring tire with rubber shoe. G. Greco, Pittsburgh, Pa.
- 1,209,042. Pneumatic tire. A. J. Savage, San Diego, Calif.
- 1,209,130. Tire protector. A. Dahl, Yardley, Pa.
- 1,209,206. Vulcanizing fuse. L. Risk, Minneapolis, Minn.
- 1,209,223. Diving dress. H. Stelzner, assignor to the firm of Drägerwerk, Heinrich & Bernh. Dräger—both of Lübeck, Germany.
- 1,209,224. Diving helmet. H. Stelzner, assignor to the firm of Drägerwerk, Heinrich & Bernh. Dräger—both in Lübeck, Germany.
- 1,209,374. Hose coupling. A. Andreoli, Meadow Lands, Pa.
- 1,209,401. Garter pocket. E. V. Crouse, Chicago, Ill.
- 1,209,442. Doubletread tire. J. F. Jablonski, Irvington, N. J.
- 1,209,509. Demountable rim. F. Spranger and N. M. Spranger, assignors to Spranger Rim and Wheel Co.—all of Detroit, Mich.
- 1,209,516. Rubber tooth brush. C. H. Thompson, assignor of one-half to F. H. Wager—both of Troy, N. Y.
- 1,209,575. Cushion tire. N. H. Hassel, Beverly Hills, Calif.
- 1,209,605. Bead for tire casings. T. J. Mell, assignor to the Republic Rubber Co.—both of Youngstown, Ohio.
- 1,209,645. Cord tire. R. B. Price, New York City, assignor to Rubber Regenerating Co., Mishawaka, Ind.

ISSUED DECEMBER 26, 1916.

- 1,209,656. Commode protector comprising an integral rubber ring. S. F. Bailey, North Warren, Pa.
- 1,209,660. Overshoe with elastic cushion at the heel. L. A. Baum, Newark, N. J.
- 1,209,715. Rubber tire and its attachment to wheels. E. B. Killen, London, England.
- 1,209,726. Recoil pad. P. J. Krueger, Blue Island, Ill.
- 1,209,740. Piston packing. C. I. E. Mastin, Midland Park, N. J.
- 1,209,763. Bath mitten. C. A. Rosengren, assignor to The Goodyear's Metallic Rubber Shoe Co.—both of Naugatuck, Conn.
- 1,209,771. Combined sleeping bag and knapsack. R. Skancke, Christiania, and J. F. Aasnes, Selvig, in Sande, Norway.
- 1,209,856. Automobile tire. W. F. Lahey, East Hartford, Conn., assignor of one-third to A. H. Miller, Holyoke, Mass.
- 1,209,978. Self-filling fountain pen. D. J. La France, Somerville, assignor to C. Brandt, Boston—both in Massachusetts.
- 1,209,986. Rubberized sheet for trunk panels and the like. C. D. Mason, assignor to The Goodyear's Metallic Rubber Shoe Co.—both of Naugatuck, Conn.
- 1,210,048. Non-skid pneumatic tire. H. Z. Cobb, Winchester, Mass., assignor to Revere Rubber Co., Providence, R. I.
- 1,210,132. Non-skid tire. I. E. Ash, Athens, Ohio.
- 1,210,155. Tire reliner. J. L. G. Dykes, Chicago, Ill.
- 1,210,219. Sectional tire having inflatable inner segmental tubes. G. Sheely and J. H. Sheely, Marshalltown, Iowa.
- 1,210,273. Packing and method of making same. R. T. Campbell, Kansas City, Mo.
- 1,210,327. Filler for tire casings comprising a mass of horsehair infiltrated with a solution of soft rubber and drained and dried. G. Kelly, Hinsdale, Ill.

ISSUED JANUARY 2, 1917.

- 1,210,466. Petticoat waistband with elastic sections. L. Gutman and B. Gutman, New York City.
- 1,210,538. Air gage for tires. E. B. Rose, Minneapolis, Minn.
- 1,210,575. Tire patching stop. J. F. White, assignor to L. E. White—both of Chicago, Ill.
- 1,210,594. Armor for automobile tires. R. J. Brooks and F. E. Martin, Malvern, Ark.
- 1,210,702. Dust cap for tire valves. A. C. Savage, Indianapolis, Ind.
- 1,210,883. Pasteboard dispensing package for elastic tape. H. A. Austin, assignor to Everlastik, Inc.—both of Boston, Mass.
- 1,210,933. Tread for resilient tires. B. C. Hamm, Boston, Mass.
- 1,210,939. Respirating device. M. Hilgers, Tazewell County, Ill.
- 1,211,005. Tire or casing spreading tool. J. B. Stroud, Pass Christian, Miss.
- 1,211,035. Pneumatic cord tire. C. L. Archer, Minneapolis, Minn.
- 1,211,042. Pneumatic life saving suit. G. Balogh, Detroit, Mich.

- 1,211,055. Elastic arch and ankle support. H. A. Bernstein, New York City.
- 1,211,056. Tire rim. J. M. Berry, Detroit, Mich.
- 1,211,067. Canvas hose couplings. N. B. Braly, Butte, Mont.
- 1,211,192. Tire protector. W. C. Logan, Loudsville, Ga.
- 1,211,214. Tire protector. A. W. Neff, Powell, Ohio, assignor of one-half to G. W. Neff, New York City.
- 1,211,225. Bath brush. A. Pludowski, assignor of one-third to S. Orłowski and one-third to W. Szczepaniak—all of Waterbury, Conn.
- 1,211,245. Valve for pneumatic tires. O. Schutz, New York City.
- 1,211,246. Vaginal syringe. N. C. E. Schwartz, Chicago, Ill.
- 1,211,369. Toy balloon. T. W. Miller, assignor to The Faultless Rubber Co.—both of Ashland, Ohio.

ISSUED JANUARY 9, 1917.

- 1,211,387. Device for connecting air hose to pneumatic tire valves. C. W. Beck, Rockville Center, N. Y., assignor to Beck-Frost Corporation, Detroit, Mich.
- 1,211,427. Tire patch. H. B. Ferguson and I. G. Ferguson, Newburgh, N. Y.
- 1,211,466. Air brake hose clamp. C. A. McKeranahan, assignor to The Westinghouse Air Brake Co.—both of Wilmerding, Pa.
- 1,211,501. Tire valve. J. W. Taylor, assignor of two-thirds to G. A. Mohr—both of Lansing, Mich.
- 1,211,619. Anti-skid or anti-slip shoe tread. A. J. Oehring, assignor of one-half to A. L. Tucker—both of Chicago, Ill.
- 1,211,642. Automobile top repair patch. H. C. Thompson, assignor to The Hall-Thompson Co.—both of Hartford, Conn.
- 1,211,662. Tire rim tool. R. A. Best, assignor of one-half to G. M. Fish—both of Grand Rapids, Mich.
- 1,211,663. Tire rim tool. R. A. Best, Grand Rapids, Mich.
- 1,211,666. Truss pad of rubber. W. T. Bobo, assignor to The Easy Truss Co.—both of Battle Creek, Mich.
- 1,211,699. Nursing vest. V. Guinzburg, assignor to I. B. Kleinert Rubber Co.—both of New York City.
- 1,211,706. Blanket for offset printing presses and method of making the same. B. W. Hoerbelt, Buffalo, N. Y.
- 1,211,769. Tire valve. M. C. Schweinert, West Hoboken, N. J., and H. P. Kraft, Brooklyn, N. Y.
- 1,211,806. Cushioned heel pad for boots and shoes. J. A. Adams, Toronto, Ontario, assignor to L. A. Adams, Montreal, Quebec—both in Canada.
- 1,211,846. Pneumatic bed for hide and leather working machines. H. A. Holder, Lynn, assignor to Holder-Perkins Co., Woburn—both in Massachusetts.
- 1,211,867. Tire patch and the process of making the same. J. G. Moomy, Erie, Pa.
- 1,211,869. Resilient tire. H. A. Naylor, Valparaiso, Chile.
- 1,211,885. Resilient wheel. B. C. Seaton, Nashville, Tenn.
- 1,211,928. Colon-irrigator. A. R. Fisher, New York City.
- 1,211,958. Pneumatic tire shoe. M. C. Overman, New York City.
- 1,212,077. Life preserver. J. W. Lewis, assignor of one-fourth to T. L. Lee—both of Boley, Okla.
- 1,212,084. Cushion tire. E. Mefford, assignor of one-fifth to R. W. Cain—both of Denver, Colo.

ISSUED JANUARY 16, 1917.

- 1,212,297. Fountain-pen. W. A. Welty, Waterloo, Iowa.
- 1,212,313. Brush set in rubber. T. F. Barry, assignor to Rubber & Celluloid Harness Trimming Co.—both of Newark, N. J.
- 1,212,315. Life belt consisting of an endless air tube and casing. S. P. Bjerre, Chicago, Ill.
- 1,212,379. Quick-acting retainer for demountable rims. C. B. Michel, Oilfields, Calif.
- 1,212,448. Tire guard. O. H. Brown, Ariel, Pa.
- 1,212,558. Automobile tire armor. G. Riddle, Riddle, Idaho.
- 1,212,640. Tire valve. E. A. Hilding, assignor to Aktiebolaget Svenska Luftventiler—both of Lidköping, Sweden.
- 1,212,641. Tire valve. E. A. Hilding, assignor to Aktiebolaget Svenska Luftventiler—both of Lidköping, Sweden.
- 1,212,677. Combined brassiere and girdle. B. Prince and H. Prince, New York City.
- 1,212,744. Fountain-pen. S. S. Crocker, Wollaston, Mass.
- 1,212,819. Nipple. F. S. Sakana, San Francisco, Calif.
- 1,212,834. Sporting shoe having a removable one-piece rubber outer sole.
- 1,212,973. Vehicle tire. W. T. Lupton, and J. M. Lupton, Martinsburg, W. Va., and J. W. Jolliffe, Clear Brook, Va.
- 1,212,985. Shoe sole comprising a cut piled fabric and a rubber compound filling. L. F. Montgomery, Fort Recovery, Ohio.
- 1,213,005. Obstetrical instrument comprising an inflatable pad. A. H. Pillsbury, assignor of one-half to V. Czeskleba—both of Lyndon Station, Wis.
- 1,213,072. Tire armor. C. Campbell, Yonkers, N. Y.
- 1,213,096. Armored pneumatic tire. B. Granville, New York City.

Chemical Patents will be found on page 266. Machinery and Process Patents on pages 270-271.

THE UNITED KINGDOM.

PATENT SPECIFICATIONS PUBLISHED.

In order to give the public the advantage of having abridgements of specifications up to date while retaining their numerical sequence, applications for patents made subsequent to 1915 are given new numbers when their complete specifications are accepted, or become open to public inspection before acceptance. The new numbers start with No. 100,001 (without any indication of date), and supersede the original application numbers in all proceedings after acceptance of the complete specifications.

[ABSTRACTED IN THE ILLUSTRATED OFFICIAL JOURNAL, DECEMBER 6, 1916.]

- 11,879 (1915). India rubber springs. F. Spencer, 77 Canon street, London.
- 11,920 (1915). Tread band for wheel tires. H. W. Barrett, 33 Livingstone Road, Gillingham, Kent.
- 11,931 (1915). Air tube for wheel tires. H. Brown, The Red House, Parkside, Wimbledon Common, Surrey.
- 11,966 (1915). Bed sore pad consisting of two layers of canvas, netting, etc., with hollow rubber balls between. A. F. E. de St. Dalmas, Tacotena, Lansdown Road, Sidcup, Kent.
- 101,734. Rubber block tire. E. W. Shaw, Oroya Links, Limited, Kalgoolie, Western Australia.
- 101,746. Egg-testing tray employing a perforated rubber covering. J. W. Ferry, of McDowell & Co., Strand Road, Londonderry, Ireland.
- 101,772. A device for cleaning and polishing metal comprising a composition block of rubber, emery and carborundum. E. B. Openshaw, 5 St. George's Crescent, Eccles Old Road, Pendleton, Manchester.
- 101,795. Tire attaching means comprising soft rubber facing for tire and metal rim. F. Kuhne, 2 Bautznerstrasse, Dresden, Germany.

[ABSTRACTED IN THE ILLUSTRATED OFFICIAL JOURNAL, DECEMBER 13, 1916.]

- 12,083 (1915). Rim attachment for solid rubber tires. D. Weisenacker, 10 Schildeckstrasse, and F. Cremer, 6 Schildeckstrasse—both in Fulda, Germany.
- 12,087 (1915). Rubber cap to fit over the muzzles of fire-arms to exclude moisture. C. Liddhard, 27 Somerset Road, Frome, Somersetshire.
- 12,180 (1915). Bed rest composed in part of rubber. Meinecke & Co., 66 Park Place, New York City. Assignees of C. W. Meinecke, East Orange, N. J., and D. Hogan, 48 Park Place, New York City—all in U. S. A.
- 12,182 (1915). Gloves with rubber finger tips. P. S. G. Dubash, 135 Highbury New Park, London.
- 12,241 (1915). Tire rim. F. W. Baker, 59 Hagley Road, Stourbridge.
- 12,284 (1915). Waterproof cover for ladies' hats. M. A. F. Haley, 39 Elizabeth street, Park Road, Little Horton, Bradford, Yorkshire.
- 12,300 (1915). Tire rim. A. J. Seex, 110 Long Acre, London.
- 101,821. Tire tool. H. J. Fussell, 16 High street, Midsomer Norton, Somerset.
- 12,317 (1915). Strips, blocks, or studs for tires molded from powdered cork combined with rubber. G. C. Twining, St. Mary's, Derby Road, Bournemouth.
- 12,367 (1915). Dental matrix or core with rubber suction disk. Dental Manufacturing Co., and H. A. Edwards, Alston House, Newman street, London.
- 12,380 (1915). Tread band for wheel tires. W. C. Taylor, 2 Stanley Road, West Bridgeford, Nottingham.
- 12,406 (1915). Watch wristlet comprising a receptacle of rubberized material and a ring of rubber. L. E. F. Wachter, 4 East 28th street, New York, U. S. A.
- 12,464 (1915). Combination cushion and pneumatic tire. A. A. Crozier, 3 Woodquest avenue, Herne Hill, London.
- 12,469 (1915). Combination pneumatic and cushion tire with sponge rubber filler. A. A. Crozier, 3 Woodquest avenue, Herne Hill, London.
- 12,559 (1915). Rubber proofed fabrics for aviators' garments. F. J. Caunter, and G. S. Coster, 116 Fore street, London.
- 101,878. Rubber bath mat. E. L. Livingston, West Orange, New Jersey, U. S. A.

[ABSTRACTED IN THE ILLUSTRATED OFFICIAL JOURNAL, DECEMBER 19, 1916.]

- 12,563 (1915). Method of attaching rubber heel pads to shoes. J. A. H. Drew, 137 Gertrude street, Fitzroy, and H. J. Drew, 4 Reid street, North Fitzroy—both in Victoria, Australia.
- 12,737 (1915). Cushion tire. A. Broussois, 99 Avenue des Ternes, Paris.
- 12,748 (1915). Shoe sole having a rubber tread joined to a leather shank. E. C. R. Marks, 57 Lincoln's Inn Fields, London.
- 12,850 (1915). Pneumatic horse collars. O. F. Horley, West Lands, New Osgoode, Saskatchewan, Canada.
- 12,858 (1915). Sectional pneumatic tires. A. Pancera, 31 Via XX Settembre, Genoa, Italy.
- 12,874 (1915). Inner tubes. A. E. Henderson, 503 Kent Building, Toronto, Ontario, Canada.
- 101,895. Reservoir pens. C. Bristow, The Chestnuts, Bowley View, Forest Hill, London.
- 101,905. Golf and like balls. P. A. Martin, Martin's Limited, Granville street, and J. Stanley, 70 Ivor Road, Sparkhill both in Birmingham.
- 101,906. Football bladder. W. W. Moren, 109 Yorkshire street, Oldham, Lancashire.
- 101,914. Electric cables. T. O. Callender, and Callender's Cable & Construction Co. Hamilton House, Victoria Embankment, London.

101,941.

Drying apparatus. B. S. Harrison, 1133 Broadway, Manhattan, New York, U. S. A.

101,942.

Vehicle wheels comprising a rubber annulus. F. Partington, 49 Pool Road, Victoria Park, Smethwick, Birmingham.

101,943.

Inner flexible lining of a milking machine teat cup. J. Treloar, Victoria street, Hamilton, New Zealand.

101,949.

Detachable rim. G. P. Robertson, Riverside, Avondale, Auckland, New Zealand.

101,955.

Golf ball. P. M. Justice, 55 Chancery Lane, London.

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PATENTS ISSUED (WITH DATES OF APPLICATION).

- 480,993 (June 1, 1915). Elastic tire for cycles and other vehicles. H. Cognet.
- 480,999 (February 18, 1916). Cellulose tire. J. Milne and J. J. Lapham.
- 481,000 (February 19, 1916). Mud splash guard for motor vehicles and others. W. J. Sherrington.
- 481,005 (February 19, 1916). Armored tires for vehicle wheels. H. M. Hillman and J. Schwab.
- 481,008 (February 19, 1916). Improvements in pneumatic tires. F. S. Dickinson.
- 481,017 (February 22, 1916). Improvements in tires for vehicle wheels. J. S. Juarez.
- 481,036 (February 22, 1916). Pneumatic wheel. J. Grippo and A. Romanach.
- 481,080 (February 29, 1916). Improvements in pneumatic tires. J. R. Poschadel.
- 481,086 (February 29, 1916). Elastic wheel. J. C. Streibich.
- 481,097 (March 1, 1916). Elastic wheel. A. D. Wack.
- 481,101 (March 1, 1916). Detachable disk-wheel. Société Française des Roues Amovibles.
- 481,122 (March 4, 1916). Rubber heel. J. M. Van Heusen.

TRADE-MARKS.

THE UNITED STATES.

- 96,315. Representation of a pneumatic tire, the words 95% AIR, 5% PLUGGER, NOT A FILLER, PUNCTURE PLUGGER, BATES, 57% PUNCTURE PLUGGER, 100% TIRE EFFICIENCY, and in the center a portrait of E. L. Bates, president of the corporation—pneumatic pluggers for tires. Bates Puncture Plugger Co., Indianapolis, Ind.
- 98,017. The word TYPOLITH—overlays, sheet-rubber, and rubber fabric. The Typolith Co., Battle Creek, Mich.
- 96,038. The word PASTIME—boots and shoes of rubber, etc. United States Rubber Co., New Brunswick, N. J., and New York City.
- 97,451. The words RELIANCE DE LUXE—druggists' sundries. The Faultless Rubber Co., Ashland, Ohio.
- 98,452. The words RUBBER rubber tires. H. B. Wallace, St. Louis, Mo.
- 98,684. The words RIE NIE—rubber paint for renewing tires, etc. Durkee-Atwood Co., Minneapolis, Minn.
- 98,854. The word PARKWAY—automobile and bicycle tires of rubber and fabric. Ajax Rubber Co., Inc., Millbrook, N. Y.
- 99,166. The word JUMBO—rubber tires or tire casings of rubber with suitable strengthening material and inner tubes for pneumatic tires. The General Tire & Rubber Co., Akron, Ohio.
- 99,170. The words THE FIRST NATIONAL STORES—elastic webs and elastic rubber webs, etc. A. M. Malouf, Salt Lake City, Utah.
- 99,349. The figures and letter 62-B—battery-jars. India Rubber Co., New Brunswick, N. J., and New York City.
- 99,425. A floral design—boots and shoes of rubber, etc. T. G. Plant Co., Boston, Mass.
- 90,642. The word HERTAS—rubber belting, hose, packing and tires. The Wirthlin-Mann Co., Cincinnati, Ohio.
- 93,841. A monogram composed of the letters H. M. R. Co.—rubber belting, etc. Hudson Mechanical Rubber Co., New York City.
- 96,309. The words TRIPLE DIAMOND—machinery belting composed of rubber and fabric. New York Belting and Packing Co., New York City.
- 96,310. A diamond-shaped design in triplicate—machinery belting composed of rubber and fabric. New York Belting & Packing Co., New York City.
- 97,014. The word SAFETY—conducting hose composed of rubber and fabric. Fabric Fire Hose Co., New York City.
- 97,401. The words YELLOW JACKIE suspenders. The Glick Co., Inc., New York City.
- 97,676. A representation of a golf ball with a black square in the center and all around diamond designs—golf balls. The Worthington Ball Co., Elyria, Ohio.
- 98,164. A representation of a golf-ball composed of squares, in the center of the ball a black oblong mark—golf-balls. J. Wanamaker, New York City.
- 99,105. A representation of a golf-ball composed of squares, and in the center three oblong marks—golf-balls. J. Wanamaker, New York City.
- 99,195. The word UNISEAR friction tape. The Mechanical Rubber Co., New York City, Chicago, Ill., and Cleveland, Ohio.
- 99,291. The word RESISTON—hard rubber compound for electrical purposes. American Hard Rubber Co., New York City.
- 92,969. The word CELLO—hot water bottles. A. S. Campbell Co., Boston, Mass.
- 98,664. The word PEARL-ZODIAC—golf balls. Martins Birmingham, Limited, Birmingham, England.
- 99,674. The word RAYAL—boots and shoes having talon soles, the talon soles attached thereto by vulcanization. Boston Rubber Shoe Co., Boston and Malden, Mass.

- 95,627. A green and yellow device rubber boots and shoes. Lambertville Rubber Co., Lambertville, N. J.
- 99,740. A design with the words "THE NORTH BRITISH" and the words "BEACON FALLS" above—rubber boots, shoes, overshoes, etc. The Beacon Falls Rubber Shoe Co., Beacon Falls, Conn.
- 374,351. The word **VULMER**—polishing material for dentists' use on vulcanite dentures and metal dentures. Claudius Ash, Sons & Co., Limited, London, W.
- 374,628. The word **QUASCO**—articles of clothing. Philip Michael Cohen, trading as Cohen & Wilks, Cheetham, Manchester.
- 375,222. The word **LIMPETITE**—packing and jointing in the nature of packing. J. W. Roberts, Limited, Midlands Works, Armley, Leeds.
- 375,510. The word **PATHAN**—steam and hydraulic packings. Robert Bel-dam, Limited, London, E. C.
- 371,697. A trapper inside a ring bearing the words "THE CANADIAN RUBBER CO., LIMITED, MONTREAL"—goods manufactured from rubber and gutta percha. The Canadian Rubber Co., Limited, Montreal, Canada.
- 373,219. The word **HIGHTENSITE**—special insulating material in which india rubber predominates. Park Royal Engineering Works, Park Royal, London, N. W.
- 374,001. A Scotch clansman, and a Highland landscape enclosed in a circular frame with the word "ECONOMIC" stamped across the whole—teapot spouts, connections for flexible tubing, protectors and sponges—all being rubber goods. N. Ross McLaren & Co., Bradford, Yorkshire.
- 374,111. A shield bearing a large letter F, surmounted by the word **FAULTLESS**—goods manufactured of rubber and gutta percha. The Faultless Rubber Co., Ashland, Ohio, U. S. A.
- 374,652. The word **STAPALITE**—goods manufactured of rubber and gutta percha. The Beldam Tire Co., Limited, Brentford, Middlesex.
- 375,402. An inverted letter Y inside of a letter O of larger font—rubber goods. Jno. Birch & Co., Limited, London Wall, London, E. C.
- 375,506. The word **GALIRUB**—goods manufactured of rubber. The Gallite & Rubber Manufacturing Co., Limited, Hammersmith, London, W.
- 375,600. Head of Pericles with the words **PERICLES, PRINCE OF TYRE, SHAKESPEARE**—rubber tires. The Dunlop Rubber Co., Limited, London, E. C.
- 377,116. The word **NIBO**—balata soles for boots and shoes. Norman Isherwood & Co., Bolton, Lancs.
- 377,425. The word **BUCKSWEE**—tobacco pouches of rubber. Robert Ernest Wright, London, E. C.
- 371,695. A moose head above the words **THE MERCHANTS RUBBER CO., LIMITED**—goods manufactured from rubber and gutta percha. The Merchants Rubber Co., Limited, Berlin, Ontario, Canada.
- 371,696. Crossed snow-shoes and a shield bearing the words **GRANBY RUBBER CO.**—goods manufactured from rubber and gutta percha. The Granby Rubber Co., Limited, Granby, Quebec, Canada.
- 373,416. A seal bearing a Scottish lion and the words **NORTH BRITISH RUBBER CO.**—rubber bands and rubber ink and pencil erasers. The North British Rubber Co., Limited, Edinburgh.
- 373,763. Two superimposed, intersecting triangles enclosing the letters **SA**—rubber toys. Aktieselskabet de forenede Gummi og Luftringe Fabrikker Schionning and Avre, Copenhagen, Denmark.
- 374,104. A rectangle enclosing the words **INVINCIBLE NORTH BRITISH RUBBER CO., LIMITED**—hair combs. The North British Rubber Co., Limited, Edinburgh.
- 375,188. The word **SUNSITE**—packing and jointing. J. W. Roberts, Limited, Leeds, Yorkshire.

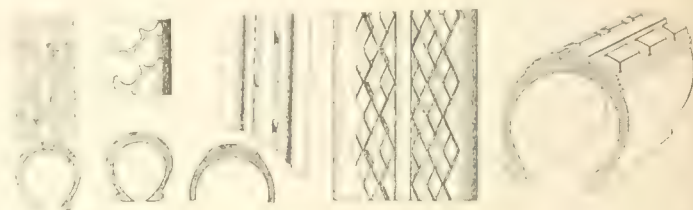
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204. An oak leaf enclosed in a circular frame bearing the words **MARQUE DE FABRIQUE DÉPOSÉE**—rubber goods, including tobacco pouches, etc. François Marie Fernaud Burrus, Blâmont.
205. The word **BURRUS**—Same.
206. The word **OMNIA**—Same.
- 1,389. The word **CAZE**—tobacco pouches. Caze, Saint-Claude, Jura.
- 10,077. The word **MAGIC** on a background of cable-net. Stanislas Gounon, 16 Rue de la République, Lyon.
- 10,008. The word **STAN** on a cable-net background enclosed in a circular frame.—Same.
- 17,242. Picture of the French "War Cross" with the words **CROIX DE GUERRE-MARQUES DÉPOSÉE**—rubber goods of all kinds. Ferdinand Guiraud, 10 Rue des Minimes, Marseille.
- 24,282. The word **TITANINE**—varnish for aeroplane wings and for proofing fabrics. The British Aeroplane Varnish Co., Limited, Newcastle-on-Tyne.
- 163,161. The word **CUIRASSE**—special protector for pneumatic tires. Société Française des Pneumatiques Dunlop, 4 Rue du Colonel Moll, Paris.
- 163,162. The words **CUIRASSE DUNLOP**—Same.
- 163,222. The word **LE CROLEUM**—rubber goods. Alfred Nortier, 43 Rue de la Folie Méricourt, Paris.
- 163,544. The words **MARQUE DÉPOSÉE UNION** on a label—rubber goods, including footwear, garments, etc. Léon Eghiasaroff, 22 Rue Theodore de Banville, Paris.
- 163,549. The words **JUSQU'AU BOUT**—rubber goods. Jean Robellet, 14 Rue de Moscou, Paris.
- 163,550. The word **PÈRE NODD**—Same.
- 163,898. An artistic label with the name **LUXIA**—rubber goods. Société Camis & Cie., 59 Boulevard de Strassbourg, Paris.
- 164,076. The word **ANHYDROL**—chemical for proofing fabrics. Pierre Aubert, 58 Rue des Dames, Paris.
- 164,077. The word **ANHYDROL**—Same.
- 164,078. The word **ANHYDRINE**—Same.
- 164,159. The word "BARALONG"—reclaimed rubber. Charles Delhomel, 2 Rue Buffault, Paris.

DESIGNS FOR TIRES.

THE UNITED STATES.

- 50,120. Vehicle tire. Term 14 years. Patented January 2, 1917. W. B. Buckley, New York City.
- 50,121. Vehicle tire. Term 14 years. Patented January 2, 1917. W. B. Buckley, New York City.
- 50,134. Vehicle tire. Term 14 years. Patented January 2, 1917. R. H. Keaton, San Francisco, Calif.



50,120 50,121 50,134 50,190 50,202

- 50,190. Tire-tread. Term 14 years. Patented January 16, 1917. E. O. Fritch, assignor to Hood Rubber Co.—both of Watertown, Mass.
- 50,202. Tire. Term 14 years. Patented January 16, 1917. E. Hopkinson, New York City.

THE FUTURE RUBBER POSITION.

RUBBER manufacturers may not attach much importance to estimates of the rubber position during the next four years, but forecasts, when made by those who are able to predict with some knowledge of the conditions, are always interesting. In this connection some statistics compiled by a well-known British market authority, with regard to the production and consumption of rubber in the years 1917 to 1920, are given in articles in the London "Stock Exchange Gazette." The authority calls attention to the wonderful expansion in the production of rubber in the last six years. During this period, he points out, the output of Brazil declined to the extent of a few thousand tons, but still amounts to nearly 40,000 tons a year, while the inferior grades of the commodity formerly contributed by Africa have declined from 24,000 tons to about half that figure. Meanwhile, of course, a remarkable expansion has taken place in the plantation output. In 1905 this amounted to a total of only 145 tons; for the year just ended the total was something between 140,000 and 150,000 tons—say, one thousand times the crop of eleven years ago. In fact very nearly three-fourth of the world's crop is now derived from plantation sources. It was feared, he says, that over-production must result from the great planting boom of 1910 and 1911, during which period some 360,000 acres of land were placed under cultivation. Although these areas are now reaching maturity, so far there has not been the slightest sign of over-production; indeed, it is doubtful if the world's crop expected after 1919 will be sufficient to keep pace with the wonderful demand.

Summarizing the results of his investigations, the authority referred to puts forward the following estimates of the world's probable production and consumption of rubber in the next four years. In these estimates no allowance was made for the German and Austrian post-bellum demand of about 20,000 tons a year. Estimated total production in 1917, 235,000 tons; in 1918, 265,000 tons; in 1919, 295,000 tons; in 1920, 314,000 tons. Estimated consumption, 1917, 230,000 tons; in 1918, 260,000 tons; in 1919, 290,000 tons; in 1920, 312,000 tons. Quite apart from future requirements of the central European powers, it would appear that during the whole period supply and demand are expected to remain very nearly balanced. On peace being declared it seems not unlikely, therefore, that a shortage in supplies will be created. It remains to be seen whether even the immense areas now under cultivation in the middle east will produce sufficient rubber fully to satisfy the world's increasing demands up to 1920.

Crude Rubber During 1916.

THE crude rubber market for the year opened with the November advance still continuing. On January 4 the high mark was reached with First latex crêpe, spot, selling at \$1.05, and Upriver fine, spot, at \$1, prices which had not been equaled since the spectacular advance in August, 1914. Small stocks were responsible for the firm tone in Upriver fine, but otherwise the market was purely speculative, due to the uncertainty of arrivals. January imports at New York, however, reached 9,400 tons, the largest monthly receipts since March and April, 1915, so that on February 1, First latex and Smoked sheet had dropped to 76 cents, and Upriver fine to 73 cents.

Imports were smaller during February, and consumers were interested only in immediate requirements. Forward deliveries were uncertain, due to lack of cargo space and slow shipment. Values, however, ranged upward, reflecting the generally firm London market until on February 29 First latex, spot, was quoted at 93 to 94 cents, and Upriver fine 77 to 78 cents. Contrary to custom, London futures were at a premium over spot rubber, indicating that lack of adequate shipping facilities constantly threaten the rubber market.

March trading was steady, but comparatively small. New York arrivals showed increasing volume, and shipments of plantation rubber from the Far East by way of the Pacific Coast became more frequent. This route is slow, chiefly because of railway car shortage in America, but the war zone and its perils, also the eastern freight congestion, are avoided thereby, and consequent high cargo and insurance rates. Minor fluctuations netted a decline of 2 to 3 cents during the month.

Direct shipments to America from the Far East by way of the Pacific Coast continued in large volume during April, 5,810,127 pounds being reported as having arrived by that route. Trading was slight, and on April 25 First latex, spot, had declined to 80 cents, Smoked sheet ribbed to 79 cents, and Upriver fine to 71 cents.

May prices still sought lower levels. Apathetic trading reflected the dull tone of the London market. Because of backward spring weather the anticipated tire business did not develop, and manufacturers still had a large accumulated stock. Imports considerably exceeded the previous month, and holders of crude rubber were reluctant to accept orders under the market. Futures higher than spot rubber in New York, with the opposite prevailing in London, was a strange anomaly, reversing the February situation. On May 29 First latex, spot, had reached 67 cents, Upriver fine, spot, 66, a decline of 10 and 3 cents respectively, within four weeks.

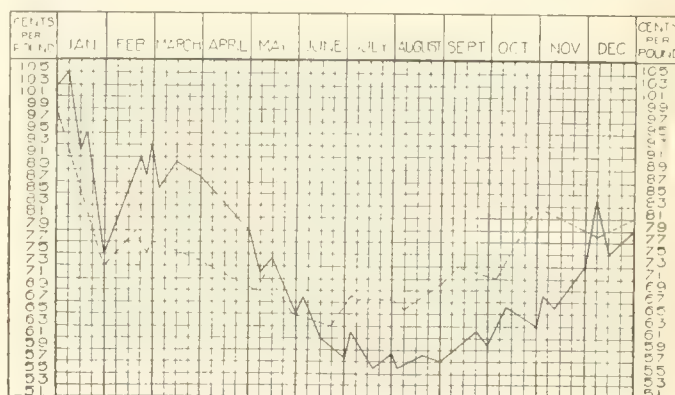
June brought only the usual desultory trading. Upriver fine, spot, had reached the low mark, 65 cents, June 1, and prices generally continued to decline, although on June 15 Upriver fine was selling at 2 cents premium over First latex. Speculative interests, however, brought the market up on June 28 to 67 cents for Upriver fine, spot, and 61 cents for First latex, spot.

Then followed four months of comparative stagnation unusual in the history of the trade. Minor fluctuations were in response to the London market. Imports continued heavy, a new record of 800 tons being established at San Francisco in July. Trading was extremely dull, sales being made in August at less than ruling prices when First latex, spot, reached its low mark of 56½ cents. Throughout this period Upriver fine took the lead in demand and price. New shipments were delayed by abnormally low water on the Amazon; stocks were scant, and heavy Russian buying still further depleted them

and advanced the price. Spot quotations in September fluctuated from 70 to 75 cents.

It was expected that the increased sale of rubber goods in October would bring an active covering of crude rubber requirements, and lower prices were indicated by reassuring reports of increased production. But the buying movement did not develop; imports were small and the trend of prices took an upward turn. The temporary fright occasioned by nearby German submarine operations sent prices up 3 to 5 cents on October 9, and although they partially subsided later, Upriver fine was quoted at 81 cents on October 30, First latex, 63½ cents.

This general upward trend in the market continued throughout the year. All grades of crude rubber were in good demand and toward the end of November trading became quite lively, with



— Upriver Fine First Latex Crêpe.

CHART SHOWING FLUCTUATIONS IN PARA AND PLANTATION SPOT RUBBER, 1916.

London shipments placed at 40 days and somewhat delayed. On November 28 Upriver fine was selling at 78 cents, First latex and Smoked sheet ribbed at 73 cents. London market conditions were generally firm with higher price levels supported by the British program of industrial expansion, and the government's requisition of more than half of the London stocks of 10,000 tons available November 1. Restricted permits at Singapore, lack of cargo space, and the loss of the "Arabia" with 350 tons of rubber on board also had their influence.

The first fortnight of December witnessed heavy buying in plantation rubber by large manufacturers. Para sorts, Africans and Centrals moved freely in sympathy with the buying activity; all recorded gains, with plantations leading the list. Holiday dullness characterized the last two weeks of the month with inquiries confined for the most part to futures. In London the sharp advance of plantations, influenced by the submarine menace, was followed by heavy forward sales that checked the buying movement. The ample supplies in sight would have stemmed the tide of an advancing market had it not been for the shortage of ship tonnage. On December 29 Upriver fine, spot, was quoted at 78 cents, First latex, spot, and Smoked sheet ribbed, spot, at 79 cents.

THE LONDON VIEW OF THE 1916 MARKET.

DURING the year 1916 the trade in rubber was continued under the emergency conditions introduced in 1915, and for the most part shipments have reached consumers with remarkable regularity and freedom. Lack of ship tonnage, however, became a matter of ever increasing concern and is now the big problem

facing the trade. Continued growth of the tire industry and the demands of the war have made the year's consumption of crude rubber practically equal to production, yet the world's available stock today is greater than ever before. London stocks on November 30 totaled 10,194 tons as follows: Plantation, 9,145 tons; Para, 177 tons; other kinds, 872 tons. British imports and deliveries of all sorts for the year were 68,405 and 65,018 tons respectively, the December figures being estimated. Of these amounts 58,341 and 54,800 tons, respectively, were other than Para and Peruvian.

THE MARKET

As a result of the bear squeeze which began in November, 1915, the year 1916 opened with very high prices and on January 6 plantation crêpe touched 4s. 3½d., but rapidly declined to 3s. With heavy fluctuations during the next three months crêpe declined to 2s. 4d. in July and to 2s. 2d. the three succeed-



Crêpe— Ribbed Smoked Sheet— Para.....

FLUCTUATIONS IN STANDARD PLANTATION GRADES AND FINE HARD PARA RUBBER, 1916.

ing months, the market being quiet in tone with small business. As in 1915, prices stiffened up in November, and aided by speculators and the reserved selling of producers reached 3s. 5½d., but the year closed quietly at 3s. Corresponding extremes for ribbed smoked sheet were 4s. 2½d. and 2s. 1½d. The fear of submarine losses and apprehension lest lack of cargo space prevent fulfilling forward contracts were important considerations contributory to the November rise.

While the demand for Para sorts has at no time equaled that for plantation, values have been well sustained and during occasional bursts of active trading prices have temporarily shown a premium over plantation. The highest and lowest quotations for the year were 4s. 1d. and 2s. 7½d. Good quality gutta percha realized high prices and the demand for balata has been constant throughout the year, Sheet closing at 3s. 2½d. and Block at 2s. 1½d.

The following closing prices for recent years may be of interest:

	Hevea	Negrohead	Negrohead	Caucho
	Block	Sheet	Island	Ball.
1914	3s. 10d.	3s. 1d.	1s. 3d.	2s. 4d.
1915	3s. 9d.	3s. 10d.	1s. 7d.	3s.
1916	3s. 3d.	1s. 11d.	1s. 3d.	2s. 2d.

The enormous exports of plantation rubber to the United States, estimated at £25,000,000, have influenced the level of American exchange in no small degree to the benefit of Great Britain.

THE WORLD'S PRODUCTION

The world's total production of crude rubber of all grades is variously estimated by authorities at 178,000 to 198,000 tons, an increase of 32,000 to 52,000 tons and commonly spoken of as 25 to 28 per cent. The greater output of plantations in the Far East is chiefly responsible for this, about 75 per cent of the world's total production now coming from that source. Despite the shortage of assistants on these great estates, their rapid growth continues, as shown by the following table of the total production of crude rubber for the last three years:

	1916.	1915.	1914.
Ceylon and India	24,500	20,600	14,800
Malaya, etc.	105,500	72,800	49,700
Amazonas (Brazil, Bolivia and Peru)....	28,255	30,700	28,345
Peruvian and Caucho.....	8,245	6,800	8,655
West Coast, Africa		2,500	2,650
Benignia and Mossamedes	2,000	1,900	1,510
Islandia		600	450
Congo, French Congo and Soudan.....	5,000	3,000	3,900
From other sources	4,500	7,100	10,380
Totals	178,000	146,000	120,380

The production of South American rubber was somewhat increased, although including more Caucho ball and less *Manicoba* and Assare. Practically all the Amazon rubber has been consumed in 1916. Central America exported very little and almost no guayule. Increased amounts have been received from West Coast Africa, especially Congo and Soudan, but very little from East Africa and Madagascar. Although Penang doubled its supply of wild rubber, Sumatra, Java and Borneo exported less Rambong rubber but more *Hevea*. The production of jelutong and balata decreased considerably.

The following table shows the annual receipts and shipments at Para during the years 1914 to 1916:

	1916.	1915.	1914.
Receipts of Para	28,260	30,595	28,170
Receipts of Peruvian.....	8,245	6,800	8,655
Shipments of Para and Peruvian to Europe.	12,045	14,440	15,985
Shipments of Para and Peruvian to America	22,185	22,960	21,690

The total 1917 production of crude rubber promises to show a further increase, although perhaps not as great as some anticipate because thinning out is wisely in active operation on many plantations. The demand shows no sign of abatement and many estates have already sold freely for 1917 and even 1918.

PLANTATION RUBBER.

While plantation acreages continue to increase in several regions of the Far East, as shown by the following estimates, the greater production of the past year is, of course, due chiefly to increased yields per acre.

	1916.	1915.	1914.
Ceylon	230,000	230,000	220,000
Malaya, Malacca	600,000	550,000	500,000
Borneo	30,000	20,000	20,000
Dutch East Indies, Java, Sumatra, etc....	500,000	450,000	400,000
India and Burma	40,000	40,000	65,000
German colonies, Samoa, East and West Africa	12,000	12,000	40,000
Totals	1,412,000	1,302,000	1,245,000

Plantations, chiefly of *Castilloa*, in Mexico, West Indies and Central and South America have shown no progress and the yields have been insignificant. The same is true of Ceara plantations in East Africa.

DISTRIBUTION.

The consumption of crude rubber of the various grades has been estimated as follows:

	1916.	1915.	1914.
England	18,000	14,000	18,000
Germany, Austria, etc.	1,500	3,000	16,430
France	8,500	7,000	5,000
Russia	20,000	16,000	11,610
Italy, etc.	4,000	2,500	4,000
Japan and Australia	5,000	4,000	2,400
America and Canada	114,000	89,500	62,940
Totals	178,000	146,000	120,380

All countries show increases except the Teutonic nations, the United States, Russia and Italy being most conspicuous. Scandinavian countries and Spain are manifesting increased activity in the rubber industry.

[The figures and information used in the above were supplied by S. Fingers & Co. and Gow, Wilson & Stanton, both of London.]

MOVEMENTS OF ALL KINDS OF RUBBER IN THE UNITED KINGDOM.

IMPORTS.

	December.			Twelve Months Ending December.		
	1916.	1915.	1914.	1916.	1915.	1914.
Dutch East Indies.....tons	855	154	...	5,538	2,863	...
From West Africa.....	11	176	...	610	714	...
Gold Coast	12	16	5	660	282	252
Other Countries in Africa.....	67	238	...	3,852	2,788	...
Penang	309	5	51	84	740	693
India	1,016	82	861	10,741	12,778	12,885
British India	154	181	...	1,692	1,468	...
Straits Settlements	1,365	1,963	3,250	19,884	29,489	21,143
Federated Malay States	2,017	861	928	19,934	12,892	9,821
Ceylon and Dependencies.....	1,025	904	1,620	10,052	12,772	9,361
Other Countries	98	94	1,176	1,455	1,787	13,706
Total Imports	6,930	5,411	7,941	75,240	78,590	67,642

EXPORTS.

	December.			Twelve Months Ending December.		
	1916.	1915.	1914.	1916.	1915.	1914.
From the United Kingdom.....tons	2,993	4,522	1,561	18,435	63,520	49,072

SUMMARY OF NEW YORK RUBBER PRICES.

	Upriver.		Islands.		
1916.	Fine.	Coarse.	Fine.	Coarse.	Cametá.
January ...	\$0.77@0.99	\$0.60@0.76	\$0.75@0.90	\$0.35@0.53	\$0.39@0.54
February ...	.73@.80	.52@.60	.67@.74	.35@.38	.37@.40
March .....	.74@.78	.56@.59	.68@.71	.34@.39	.36@.40
April .....	.74@.74	.55@.57	.65@.69	.36@.40	.38@.40
May .....	.67@.72	.50@.54	.61@.67	.30@.37	.35@.38
June .....	.62@.68	.42@.50	.57@.62	.27@.31	.33@.35
July .....	.65@.68	.41@.42	.58@.59	.26@.28	.33@.34
August .....	.65@.68	.39@.40	.57@.59	.27@.28	.32@.33
September ..	.69@.74	.41@.44	.58@.62	.28@.30	.34@.38
October .....	.71@.80	.42@.46	.60@.71	.29@.33	.31@.35
November ..	.70@.80	.45@.47	.69@.72	.30@.32	.32@.33
December ..	.78@.81	.47@.56	.69@.72	.30@.34	.31@.36

AVERAGE PRICES.

		\$0.50	\$0.66	\$0.33	\$0.35 3/4
1916	80.24	.47 1/2	.33	.31	.33
1915	61.18	.47 1/2	.33	.31	.33
1914	73.8	.47 1/2	.33	.31	.33
1913	87	.58	.70	.46	.42
1912	101	.58	.70	.59	.63 3/4
1911	108	.95	1.16	.64	.70 3/4

FEDERATED MALAY STATES RUBBER EXPORTS.

An official cablegram from Kuala Lumpur reports that the export of plantation rubber from the Federated Malay States for the month of December amounted to 5,717 tons, compared with 6,776 tons in November (which was the highest on record), and 5,111 tons for the corresponding month of 1915. The total export for the past year amounted to 62,763 tons, as against 44,524 tons in 1915 and 30,697 tons in 1914. In 1909 the total export was only 2,641 tons and in 1910 (the year of the "boom") 5,452 tons, or less than is now exported in one month. The Federated Malay States export of plantation rubber is about half of the world's output. Appended are the comparative statistics:

	1914.	1915.	1916.
January	2,542	3,473	4,471
February	2,364	3,411	5,207
March	2,418	3,418	4,429
April	2,151	2,777	3,914
May	2,069	2,708	3,956
June	2,306	3,403	5,121
July	2,971	3,687	5,053
August	1,850	3,796	5,782
September	2,879	3,984	6,376
October	2,897	4,120	5,968
November	2,889	4,636	6,776
December	3,361	5,111	5,717
Totals	30,697	44,524	62,763

EXPORTS OF INDIA RUBBER FROM PARA AND MANAOS DURING DECEMBER, 1916.

NEW YORK.

EXPORTERS.	Fine.	Medium.	Coarse.	Caucho.	TOTALS.
I. Manos	114,111	36,811	143,330	115,065	409,307
Stowell & Co.	260,114	17,062	80,141	1,497	358,814
General Rubber Co.	135,101	8,463	78,267	3,932	225,763
Ad. H. Alden, Ltd.	17,862	18,318	29,920	36	66,136
Pires Teixeira & Co.	83,335	8,807	77,001	12,423	181,566
Suarez Hermanos & Co., Ltd.	56,350	...	7,383	...	63,733
G. Fradelizi & Co.	9,520	510	19,729	4,612	34,371
Seligmann & Co.	42,059	35	34	1,584	43,712
Stowell & Co.	73,716	161	96,749	27,319	197,945
From Itacoatiara	792,071	90,156	532,547	166,468	1,581,242
From Manaos	13,600	510	8,840	2,465	25,415
From Iquitos	607,247	127,590	243,632	58,245	1,036,714
From Iquitos	154,816	19,901	68,404	215,283	458,404
Totals, December, 1916	1,567,734	238,157	853,423	442,461	3,101,775
November, 1916	831,347	91,128	278,465	105,136	1,306,076
October, 1916	534,595	27,873	32,933	266,489	861,890
September, 1916	869,014	90,689	329,205	75,342	1,364,250

EUROPE.

EXPORTERS.	Fine.	Medium.	Coarse.	Caucho.	TOTALS.
I. Manos	114,111	36,811	143,330	115,065	409,307
Stowell & Co.	124,239	10,149	...	5,700	140,088
General Rubber Co. ....	...	...	...	7,444	142,043
Ad. H. Alden, Ltd. ....	...	...	...	14,612	149,835
Pires Teixeira & Co.	135,223	...	...	30,940	215,971
Suarez Hermanos & Co., Ltd.	29,750	1,190	...	10,563	31,943
G. Fradelizi & Co.	9,888	899	641	...	11,428
Seligmann & Co. ....	...	...	...	...	43,712
Stowell & Co.	8,338	806	1,143	3,300	13,910
From Itacoatiara	398,471	13,044	2,275	41,619	455,409
From Manaos	16,786	1,708	1,796	37,771	58,061
From Iquitos	463,693	34,016	9,458	70,892	578,059
From Iquitos	16,786	1,708	1,796	37,771	58,061
Totals, December, 1916	878,950	48,768	13,529	150,282	1,091,529
November, 1916	777,886	60,979	59,652	330,117	1,228,634
October, 1916	970,163	106,884	480,473	156,071	1,713,591
September, 1916	639,662	39,313	27,798	193,476	900,249

EXPORTS OF INDIA RUBBER FROM MANAOS DURING DECEMBER, 1916.

NEW YORK.

EXPORTERS.	Fine.	Medium.	Coarse.	Caucho.	TOTALS.
Tancredi Porto & Co.	184,370	42,981	57,416	19,775	304,542
General Rubber Co. of Brazil.	19,124	15,475	39,567	19,391	93,557
Adelbert H. Alden, Ltd.	3,778	30,330	54,555	83	88,651
Stowell & Co.	17,416	14,482	27,237	15	169,180
J. G. Araujo	80,261	18,240	28,222	160	135,883
Ohliger & Co.	60,958	2,440	6,203	11,541	81,141
G. Fradelizi	5,280	...	2,609	337	8,226
H. Balding	23,176	...	...	...	23,176
J. L. Traqueira	5,106	...	...	...	6,812
Manos	114,111	36,811	143,330	115,065	409,307
In transir, Iquitos.....	199,128	19,901	82,249	217,141	518,419
Totals, December, 1916	717,627	144,556	298,956	268,448	1,429,587
November, 1916	41,141	60,694	120,180	11,300	605,270
October, 1916	211,804	51,370	101,151	12,933	377,258
September, 1916	259,336	36,882	72,767	23,185	392,179
August, 1916	435,997	47,117	84,672	24,754	592,535
July, 1916	238,014	21,593	31,284	204,740	495,631
January to June, 1916	2,537,504	410,024	996,427	1,438,355	5,382,310

EUROPE.

EXPORTERS.	Fine.	Medium.	Coarse.	Caucho.	TOTALS.
Tancredi Porto & Co.	105,364	6,098	1,060	15,547	128,069
General Rubber Co. of Brazil.	183,863	24,683	759	33,863	250,000
Adelbert H. Alden, Ltd.	127,978	34	122	14,722	142,856
Stowell & Co.	9,120	320	...	6,730	16,170
J. G. Araujo	17,280	...	...	...	17,280
Ohliger & Co. ....	...	...	...	...	81,141
G. Fradelizi	19,458	2,881	...	...	22,339
H. Balding .....	...	...	...	...	23,176
J. L. Traqueira .....	...	...	...	...	6,812
Manos	114,111	36,811	143,330	115,065	409,307
In transir, Iquitos.....	463,693	34,016	9,458	70,892	578,059
Totals, December, 1916	480,479	35,724	11,254	108,663	636,120
November, 1916	599,987	53,330	56,958	189,368	899,643
October, 1916	379,338	25,247	16,446	139,758	550,207
September, 1916	351,246	33,813	9,713	138,625	533,397
August, 1916	272,281	20,604	10,127	258,293	561,305
July, 1916	68,650	43,932	18,914	269,029	406,525
January to June, 1916	1,450,817	313,896	242,475	1,240,885	3,248,073

(Continued on page 304.)

Review of the Crude Rubber Market.

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NEW YORK.

JANUARY has proved to be a very dull and uninteresting month that closely parallels the market conditions of a year ago. While this time of year is generally unfavorable for large buying, the fact remains that the mills have been exceptionally busy, which augurs well for the future, at least. The considerable trading that has been indulged in between dealers is the only redeeming feature of an otherwise colorless rubber market. The large manufacturers appear to be well fortified with ample stocks and contract deliveries are regularly arriving. It would seem that the heavy buying interests are cautiously covering their requirements far enough ahead and in a manner that will not bull the market. The reports of ample plantation production and surplus stocks in London are reassuring, it is true, but the constantly increasing shipping difficulties constitute a formidable portent.

On January 2, First latex crêpe and Smoked sheet ribbed, spot, were 80 cents with January-June deliveries at 77 cents. Upriver fine was quite firm around 79 cents. The generally quiet conditions that have ruled during the month were reflected in easier prices that have recorded a decline of 6 cents in plantations and 2 cents in Paras. On January 27 First latex crêpe and Smoked sheet ribbed, spot, rubber were easy at 74 cents with futures as follows: February-March, 73 to 73½; April-May, 71, and July-December, 68. Upriver fine was steady at 77 cents.

LONDON.

The London situation has been remarkably sustained, in view of possible contingencies, by ample stocks. The importers are alive to the many difficulties that harass ocean trade at this time and also the inevitable result of an unbalanced market.

Stocks of rubber in London on January 1 compared with holdings at the same date in the two preceding years are as follows:

	1916.	1915.	1914.
Centrals and South American.....	24	10	16
Mattogrosso.....	15	2	66
Plantation (Ceylon, Malay, etc.).....	9,892	6,618	5,904
Rangoon and Assam.....	3	5	3
Penang.....	78	51	59
Malaysian.....	..	..	1
Mozambique.....	13	14	185
Madagascar.....	14	5	3
African, etc.....	152	95	192
Totals.....	10,199	6,809	6,704

London imports for December were 5,150 tons against 6,118 tons for November; Liverpool imports for December were 1,771 tons against 1,192 tons for November. The reexports for December were as follows: London, 2,421 tons; Liverpool, 368 tons, compared to 4,656 and 951 tons, respectively, for November.

Prices have not changed to any great extent. On January 2, First latex crêpe and Smoked sheet ribbed were 73 cents in a firm market. On January 26, First latex crêpe and Smoked sheet ribbed had declined to 70.5 cents.

SINGAPORE.

A record quantity of 1,003 tons was catalogued for the December 6 auction, of which 586 tons were sold. There was a strong demand for First latex pale crêpe at 65.8 cents and Smoked sheet ribbed sold readily at 65 to 65.8 cents. The lower qualities sold well at an average price of 63.3 cents. The December 13 auction brought out 954 tons and only 109 tons were sold, showing the depressed market conditions. A few lots of Smoked sheet ribbed sold at 69 to 70 cents. First latex pale crêpe was not in demand and a few small sales were made at 68 to 69 cents. The average prices obtained at the last auction held in December and the first three in January are as follows: First latex pale crêpe, 63.1 cents,

and Smoked sheet ribbed, 62.36 cents. The amount sold was 1,672 tons, compared to 1,350 tons sold at the first four auctions in December.

COLOMBO.

The closing of the auction sales at Colombo due to the inability of the banks to handle drafts has made reports of price quotations impossible. Orders are therefore being sent to London for attention.

BATAVIA.

The auction of November 24, 1916, brought out 7,601 pounds, all of which was sold in a firm market, Smoked sheet ribbed bringing 65 cents. The next auction will be held on December 1, and 32,164 pounds are already registered.

MEDAN.

The fourth Medan auction was held on November 16, 1916, when 46,164 pounds were sold. First latex crêpe and Smoked sheet ribbed sold readily in a firm market. The next auction will be held November 30.

NEW YORK QUOTATIONS.

Following are the quotations at New York one year ago, one month ago and January 29, the current date:

PARA.	Feb. 1, 1916.	Jan. 1, 1917.	Jan. 29, 1917.
Upriver, fine, new.....	76 @	78 @	77 @
Upriver, fine, old.....	.....	.....	.....
Islands, fine, new.....	69 @	70 @	72 @
Islands, fine, old.....	.....	.....	.....
Upriver, coarse, new....	54 @	53 @	50 @
Upriver, coarse, old....	.....	.....	.....
Islands, coarse, new....	35 @	34 @	31 @
Islands, coarse, old....	.....	.....	.....
Cametá.....	37 @	33 @	32 @
Caucho, ball, upper....	59 @ 61	54 @	51 @
Caucho, ball, lower....	56 @	50 @	49 @
PLANTATION.			
First latex crêpe.....	78 @	{ Spot... 79 @ Futures 76 @	{ Spot... 75 @ 75½ Apr.-June 72 @
Amber crêpe, light....	.....	{ Spot... 75 @ Futures 73 @	{ Spot... 71 @ 72 Futures.....
Brown crêpe, clean....	.....	{ Spot... 74 @ Futures 69 @ 70	{ Spot... 70 @ 71 Futures.....
Smoked sheet, ribbed..	78 @	{ Spot... 79 @ Futures 76 @	{ Spot... 75 @ 75½ Apr.-June 72 @
Fine sheets and biscuits, unsmoked.....	78 @	.....	.....
CENTRALS.			
Corinto.....	55 @ 56	51 @	49 @
Esmeralda, sausage....	54 @ 55	50 @	47 @ 48
Nicaragua, scrap.....	53 @ 54	48 @	47 @
Mexican plantation, sheet	60 @ 61	49 @	54 @ 56
Mexican, scrap.....	53 @ 54	48 @	46 @
Mexican, slab.....	35 @ 36	34 @	31 @
Manicoba.....	45 @ 46	35 @ 36	42 @
Mangabeira, sheet.....	35 @ 38	36 @	40 @
Guayule.....	41 @ 42	42 @ 44	42 @ 44
Balata, sheet.....	4 @	75 @	78 @ 78½
Balata, block.....	46 @	63 @	64 @ 64½
AFRICAN.			
Lopori, ball, prime....	.....	.....	.....
Lopori, strip, prime....	.....	.....	.....
Upper Congo, ball, red.	.....	.....	.....
Rio Nunez Niggers.....	62 @	62 @	62 @ 63
Conakry Niggers.....	71 @ 77	60 @	60 @ 62
Massat, red.....	71 @ 72	60 @	60 @
Soudan, Niggers.....	.....	.....	.....
Cameroon, ball, soft....	.....	.....	.....
Cameroon, ball, hard....	.....	.....	.....
Benguela, No. 2, Superior	.....	76 @	44 @
Benguela, No. 2.....	40 @ 41	34 @	41 @
Accra, flake.....	40 @	30 @	30 @
EAST INDIAN.			
Assam.....	.....	.....	50 @
Pentamak.....	81 @ 84	81 @	91 @
Gutta Siak.....	13 @ 13½	14 @	.....
Gutta red Niger.....	.....	28 @	22 @
Borneo III.....	35 @ 35½	.....	.....
Gutta Percha, red Macassa	1.50 @ 2.00	1.90 @	1.90 @

COMPARATIVE NEW YORK PRICES FOR JANUARY.

In regard to the financial situation, Albert B. Beers (broker in crude rubber and commercial paper, No. 68 William street, New York) advises as follows:

"During January the market for commercial paper in the rubber line has continued steady, the best names selling freely at 4@4½ per cent, and those not so well known 4½@5 per cent, with some small names at 5½ per cent."

	1917.*	1916	1915.
Upriver, fine	\$0.76@0.79	\$0.77@0.99	\$0.61@0.75
Upriver, coarse .....	.53@.53	.60@.76	.45@.58
Islands, fine .....	.67@.70	.75@.90	.53@.70
Islands, coarse .....	.32@.36	.35@.53	.29@.37
Cameta .....	.33@.35	.39@.54	.31@.41

*Figured only to January 27.

MARKET CABLE SERVICE FROM LONDON.

The following market report has been cabled from Aldens' Successors, Limited, London:

Date.	Standard Crêpe.	Ribbed Smoked Sheet.	Market.
December 27	70	70	Quiet
January 2	73	73	Firm
January 8	73	73	Firm
January 15	73	73	Firm
January 22	71.5	72	Steady

MARKET CABLE SERVICE FROM SINGAPORE.

The following reports of the weekly auctions held at Singapore have been cabled by The Waterhouse Co., Limited:

Date.	Crêpe. Price lb.	Smoked Sheet. Price per lb.	Tons Sold.	Market.
December 29.....cents	61.63	57.8	368	Fair demand for best grades.
January 6, 1917....	64.18	64.6	494	Good demand for all descriptions.
January 13	64.6	64.6	425	Market dull.
January 19	62.05	62.48	367	Market dull. Supplies are large.

WEEKLY RUBBER REPORT.

GUTHRIE & CO., LIMITED, Singapore, report [December 13, 1916]:

There was a very poor demand at the auction held today, and of a total of 960 tons catalogued for sale only 181 tons changed hands. Bidding throughout was very slow and owing to the absence of competition the majority of parcels were withdrawn. At the opening \$165 was paid for one lot each of Standard Crêpe and Standard Sheet, but as the sale progressed the falling off in the demand for these grades was most marked, a good number of lots not even eliciting bids. The lower grades are about \$4 lower on the week. There was no scrap sold. The following was the course of values:

	In Singapore per picul.*	Sterling equivalent per pound in London.	Equivalent per pound in cents.
Sheet, fine ribbed smoked.....	\$155@165	3/ @ 3/ 2½	72.98@85.39
Sheet, good ribbed smoked.....	155@157	3/ @ 3/ ½	72.98@73.99
Sheet, plain smoked.....	142@147	2/9¼ @ 2/10¾	68.41@70.18
Sheet, plain unsmoked.....	137@143	2/8¼ @ 2/ 9½	65.37@67.91
Crêpe, fine pale.....	161@165	3/1¼ @ 3/ 2½	75.51@77.28
Crêpe, fine brown.....	137@146	2/8¼ @ 2/10½	65.37@69.17
Crêpe, good brown.....	116@130	2/3¾ @ 2/ 6¾	56.51@62.33
Crêpe, dark.....	108@121	2/ 6½ @ 2/ 6½	52.95@60.08
Crêpe, bark.....	86@113	1/9¼ @ 2/ 3¼	43.58@55.24

*Picul = 133½ pounds.

Quoted in S. S. dollars = 2/4 [56.7 cents].

PLANTATION RUBBER FROM THE FAR EAST.

TOTAL EXPORTS FROM MALAYA.

(From January 1, 1916, to dates named, exclusive of all foreign transshipments. Reported by Barlow & Co., Singapore.)

To—	Singapore.	Malacca.	Penang.	Port Swettenham.	Totals.
	October 31, 1916.	October 31, 1916.	October 31, 1916.	November 30, 1916.	
United Kingdom.....lbs.	26,854,241	6,376,557	21,416,167	27,983,933	82,630,898
The Continent	9,777,777	.....	5,773	.....	9,422,003
Japan	3,508,344	.....	.....	.....	3,508,344
Ceylon	604,283	.....	563,600	1,615,073	2,782,956
United States	69,509,518	.....	9,105,067	1,716,875	80,331,460
Australia .....	.....	.....	.....	.....	268,302
Total	110,110,958	6,376,557	31,140,567	31,315,881	178,943,963
Same period, 1915....	66,782,158	6,617,032	24,322,531	26,116,143	123,837,864
Same period, 1914....	32,919,222	4,108,376	20,009,367	29,316,677	86,353,642
Same period, 1913....	21,830,702	.....	12,925,467	25,540,448	60,296,617

EXPORTS OF CEYLON GROWN RUBBER.

(From January 1 to November 27, 1915 and 1916. Compiled by the Ceylon Chamber of Commerce.)

To—	1915.	1916.
United States	16,705,051	24,193,954
Canada and Newfoundland.....	392,495	6,720
France	497,892	1,587,537

Russia	332,200	248,874
Italy .....	.....	164,640
United Kingdom	21,856,189	20,113,766
Australia	791,277	783,651
India	1,530	1,358
Straits Settlements	119,933	43,680
Japan	260,421	315,529
Totals	40,956,988	47,459,769

(Same period 1914, 32,205,528 pounds; same period 1913, 23,387,980.) The export figures of rubber, given in the above table for 1914, include the imports reexported. (These amount to 2,686,710 pounds from the Straits Settlements and 714,637 pounds from India.) To arrive at the total quantity of Ceylon rubber exported for that year deduct these imports from the total exports. The figures for 1915 and 1916 are for Ceylon rubber only.

STRAITS SETTLEMENTS RUBBER EXPORTS.

An official cablegram from Singapore gives the figures of the export of plantation rubber from Straits Settlements ports during the month of November as 5,247 tons, against 5,233 tons in October last and 4,292 tons in the corresponding month last year. This gives a total of 45,431 tons for eleven months of the current year, against 31,886 tons in 1915 and 17,393 tons in 1914. Appended are the comparative figures:—

	1914.	1915.	1916.
January	1,181	2,576	4,443
February	1,703	2,741	3,359
March	1,285	2,477	4,481
April	1,548	1,978	4,219
May	1,309	3,588	3,274
June	1,480	2,249	3,836
July	1,584	2,324	5,106
August	1,325	2,295	3,246
September	1,602	4,725	2,987
October	2,006	2,641	5,233
November	2,370	4,292	5,247
Totals	17,393	31,886	45,431

These figures include transshipments of rubber from various places in the neighborhood of the Straits Settlements, such as Borneo, Java, Sumatra and the non-Federated Malay States, as well as rubber actually exported from the Colony, but do not include rubber exports from the Federated Malay States.

IMPORTS AND EXPORTS OF RUBBER AND GUTTA AT SINGAPORE.

IMPORTS.

From—	Para Rubber.	Para Rubber for Treatment.	Borneo Rubber.	Gutta Percha.	Gutta Jelutong.
Malay Peninsula—					
Port Swettenham.....pounds	1,654,666	34,933	.....	.....	.....
Teluk Anson	1,191,866	.....	.....	.....	.....
Muar	878,266	.....	.....	.....	.....
Penang	480,266	106,933	.....	1,333	.....
Malacca	385,466	671,866	.....	.....	.....
Kelantan	145,466	9,886	.....	.....	.....
Port Dickson	119,600	.....	.....	.....	1,066
Kuantan	38,933	.....	.....	.....	.....
Rengat	10,800	.....	.....	.....	.....
Mersing	9,466	.....	.....	.....	.....
Totals	4,914,795	323,618	.....	1,333	1,066
Borneo—					
Sarawak	145,400	56,133	4,533	12,133	1,240,000
Bandjermassin	111,466	19,200	.....	69,466	218,266
Pontianak	93,200	4,400	3,200	1,333	33,200
Labuan	37,866	10,133	.....	4,533	62,533
Jesselton	32,800	273,733	.....	533	.....
Sambas	32,133	.....	533	.....	16,000
Kulit	31,200	27,866	.....	266	.....
Sandakan	27,200	27,733	1,866	.....	266
Pleat	13,200	.....	.....	.....	.....
Singawang	6,133	.....	.....	.....	.....
Samarinda	4,133	.....	4,000	3,466	.....
Sampit	2,666	.....	.....	.....	256,000
Sibu	800	.....	.....	.....	92,133
Totals	557,997	419,198	14,132	91,730	1,918,398
Sumatra—					
Djambi	262,800	.....	.....	4,466	.....
Belah	128,533	540,800	.....	.....	.....
Pelawan	42,666	314,933	.....	.....	.....
Palembang	20,933	.....	.....	.....	279,333
Indraghiri	13,333	17,066	.....	.....	11,466
Asahan	8,666	65,066	.....	.....	.....
Sibolga	6,000	.....	.....	.....	.....
Bengkalis	3,200	.....	.....	.....	.....
Muntok .....	.....	.....	.....	.....	.....
Totals	487,064	937,865	.....	4,466	280,999
Java—					
Sourabaya .....	.....	63,166	.....	.....	.....
Batavia .....	.....	.....	.....	.....	.....
Totals	161,032	.....	.....	.....	.....
Siam—					
Patani	1,733	.....	.....	.....	.....
Bangkok	1,066	.....	.....	.....	.....
Totals	2,799	.....	.....	.....	.....
Burma—					
Rangoon	4,.....	.....	.....	.....	.....
Other ports	336,533	154,800	6,133	6,533	120,666
Grand Totals	6,464,486	1,835,481	20,265	104,262	2,330,929

EXPORTS.

November, 1916.

	Rubber.	Trans- Borneo Rubber	Gutta Percha.	Gutta Jelutong.
United States				
New York	138,400			
San Francisco	20,266		160,800	1,125,000
Grand Totals	10,443,996	3,055,865	510,266	3,088,132

LONDON AND LIVERPOOL RUBBER STATISTICS.

IMPORTS.

November, 1916.

	London.		Liverpool.	
	Pounds.	Value.	Pounds.	Value.
French West Africa.	780,400	485,320		
Other Dutch Possessions in Indian Seas	1,013,300	622,727		
United States	3,400	896		
Mexico	4,390	2,047		
Nicaragua	1,390	524		
Venezuela	900	443		
Brazil			2,036,200	1,203,890
Gold Coast			68,700	21,734
Nigeria			90,700	34,453
Cape of Good Hope	48,100	34,653		
British East Africa	5,900	2,699	6,700	2,856
Zanzibar	20,200	10,172		
Uganda	800	500		
New Zealand	7,200	3,308		
Seychelles	700	333		
British India	180,900	105,934	2,200	1,095
Straits Settlements	2,659,300	1,841,977	304,100	201,591
Fed. Malay States	6,713,900	4,055,678	15,700	9,487
Ceylon and Depend-				
ences	1,974,200	1,196,973	41,600	27,042
British N. Borneo	259,800	138,568		
New South Wales	6,300	4,746		
Up Islands	4,500	2,380		
British West Indies	2,500	1,528		
British Guiana	400	99		
Totals	13,705,500	\$8,521,406	2,671,100	\$1,563,390

Waste and reclaimed rubber:				
From Canary Islands	1,800	\$95		
United States	69,700	9,539	16,300	\$2,518
Brazil			380	405
Channel Islands	1,000	48		
Exempt	8,700	843		
Natal	7,800	240		
Ceylon and Depend-				
ences	4,800	195		
New Zealand	7,800	638		
Canada	7,600	2,333		
Totals	109,300	\$13,931	20,100	\$2,923

EXPORTS.

Waste and reclaimed rubber manufactures of the United Kingdom:				
To France	121,800	\$8,149	10,000	\$1,509
Italy	42,100	2,594		
United States	982,000	66,459		
Straits Settlements		24		

PARAS FROM BRAZIL.

JANUARY 6, 1917.—By the <i>Sao Paulo</i> from Para and Manaos:				
	POUNDS.			
Pell & Dumont	40,500			
H. A. Astlett & Co.	140,900			
Henderson & Korn	11,300			
Crossman Sielcken	48,400			
Muller, Schall & Co.	112,200			
Knauth, Nachot & Kohn	17,000			
Paul Bertuch	23,300			
Meyer & Brown	13,200			
Arnold & Zeiss	92,400			
W. R. Grace & Co.	3,300			
E. F. Granier	147,000			
W. A. Brown & Co.	14,700			
Totals	653,200			

JANUARY 24.—By the *Hubert* from Para:

	POUNDS.
H. A. Astlett & Co.	81,500
Arnold & Zeiss	185,000
W. R. Grace & Co.	5,000
Hagemeyer & Brunn	5,000
Paul Bertuch	139,000
Aldens' Successors, Ltd.	2,500
J. Henry Schroeder & Co.	163,500
Various	946,500
Totals	1,550,500

POUNDS.

PARAS.

JANUARY 18.—By the <i>Advance</i> —Cristobal:				
W. R. Grace & Co.	23,400			
CENTRALS.				
DECEMBER 22.—By the <i>Caracas</i> —Puerto Cabello:				
American Trading Co.	440			
DECEMBER 22.—By the <i>Almirante</i> —Cartagena:				
Pablo Calvet & Co.	5,280			
G. Amsinck & Co.	5,280	11,560		
DECEMBER 22.—By the <i>Advance</i> —Colon:				
Mecke & Co.	4,950			

EXPORTS.		RE-EXPORTS.	
	Value.		Value.
New York	1,323		
Canada	88,200		
Spain		106,800	\$11,866
Crude rubber:			
United States	1,374,900		\$656,364
Spain	62,500		39,670
United States	1,437,200	861,189	286,100
Spain	48,100	256,916	23,500
United States	6,232,700	3,504,873	355,300
Spain	579,500	320,834	65,800
Spain		31,300	17,303
Waste and reclaimed rubber:			
United States	10,429,500	\$5,982,667	2,131,300
Spain			\$8,639
Totals	\$29,900	\$10,615	\$35,600

CRUDE RUBBER ARRIVALS AT THE PORT OF NEW YORK.

(By Tonnage—Indicates Weight in Pounds.)

PARAS FROM BRAZIL.

Arrivals by steamers *Manoel Gonsalves*, *Gregory*, *Atahualpa* and *Cuthbert* are incomplete due to information being withheld by the steamship companies.DECEMBER 18.—By the steamer *Minas Geraes* from Para:

	Fine.	Medium.	Coarse.	Caucho.	Total.
H. A. Astlett & Co.	57,040	11,200	69,440		128,000
Muller, Schall & Co.	81,280	5,760	64,200	17,700	180,000
Various					742,000
Totals					1,050,000

DECEMBER 26.—By the steamer *Gregory* from Para:

Aldens' Successors, Ltd.	48,000	22,000	86,000		156,000
H. A. Astlett & Co.	31,900	24,600	31,300	11,200	99,000
W. R. Grace & Co.	83,200		27,400	23,800	134,400
Various					487,400

JANUARY 3.—By the steamer *Atahualpa* from Para:

					(Cameta)	
General Rubber Co.			6,000	4,420=	55,000	
Henderson & Korn				=	61,200	
H. A. Astlett & Co.	4,480	22,400	107,520	17,920=	152,000	
Arnold & Zeiss	132,800	9,280	55,800	5,720=	203,600	
Various					475,000	

JANUARY 5.—By the steamer *Cuthbert* from Para and Manaos:

Raw Products Co.					75,500
Pell & Dumont					40,500
H. A. Astlett & Co.					245,000
Henderson & Korn					12,000
Meyer & Brown					20,500
General Rubber Co.	35,820	3,800	11,400		49,500
Arnold & Zeiss	19,150	7,680	45,000	520	72,300
Aldens' Successors, Ltd.	14,900	34,000	73,000		121,000
W. R. Grace & Co.	50,987				51,000
Various					813,700

JANUARY 8.—By the steamer *Sao Paulo* from Para and Manaos:

H. A. Astlett & Co.	113,600	3,520	95,000	71,500	283,620
Pell & Dumont			16,800		16,800
Muller, Schall & Co.			100,160		100,160
W. R. Grace & Co.	2,970			9,520	12,490
Paul Bertuch	3,200		600		3,800
Meyer & Brown			18,000		18,000
Arnold & Zeiss	58,880	4,800	22,200		85,880
Various	86,960	1,920	31,800	25,800	146,480
Totals	265,610	110,400	184,400	106,820	667,230

POUNDS.

POUNDS.

POUNDS.		POUNDS.		POUNDS.	
DECEMBER 23. By the <i>Maya</i> =Hull:		JANUARY 23.—By the <i>Panama</i> =Cristobal:		DECEMBER 24. By the <i>Maya</i> =Hull:	
Yeguas Lobo & Co.	13,640	G. Amsinck & Co.	13,640	Rubber Trading Co.	10,500
DECEMBER 26. By the <i>El Lute</i> =Galveston:		G. Gontard	4,500	Charles T. Wilson Co., Inc.	24,000
Various	13,850	W. R. Grace & Co.	4,300	Goodyear Tire & Rubber Co.	189,600
DECEMBER 26. By the <i>Inganys</i> =Chile:		J. S. Sembrada & Co.	1,200	L. Littlejohn & Co.	161,800
Muller, Schell & Co.	5,170	Andean Trading Co.	8,400	Various	65,800
DECEMBER 26. By the <i>Monterey</i> =Vera Cruz:		G. Ph. Nider	6,000	DECEMBER 24. By the <i>Maya</i> =Hull:	
J. A. Medina & Co.	350	Lawrence Turnure & Co.	6,000	pure:	
DECEMBER 27. By the <i>Panama</i> =Cristobal:		Dumarest Bros.	4,700	I. T. Johnstone & Co.	590,500
G. Amsinck & Co.	60,500	Pablo Calvet & Co.	2,600	Rubber Trading Co.	77,000
W. R. Grace & Co.	4,000	L. Touse & Co.	3,700	Fred. Stern & Co.	44,000
Neuss, Hesslein & Co.	2,000	D. C. Andrews	1,000	W. R. Grace & Co.	39,600
Fidanque Bros. & Co.	7,040	Otto Gerdaun & Co.	44,200	East Asiatic Co.	77,700
DECEMBER 26. By the <i>Maya</i> =Hull:		Piza Nephews & Co.	2,600	Meyer & Brown	63,500
G. Amsinck & Co.	3,500	Various	12,800	Arthur Meyer & Co.	201,500
Meyer Hecht	220	JANUARY 25.—By the <i>Steinstad</i> =Guyaquil:		Fox & Co.	53,000
DECEMBER 26. By the <i>Maya</i> =Hull:		G. Amsinck & Co.	5,200	Robinson & Co.	187,700
G. Amsinck & Co.	440	Pablo Calvet & Co.	28,500	Charles T. Wilson Co., Inc.	182,000
DECEMBER 26. By the <i>Maya</i> =Hull:		A. M. Capen's Sons	1,600	Aldens' Successors, Ltd.	30,000
G. Amsinck & Co.	3,500	D. C. Andrews & Co.	2,500	Henderson & Korn	768,700
Meyer Hecht	220	Otto Gerdaun & Co.	34,100	Goodyear Tire & Rubber Co.	123,000
DECEMBER 26. By the <i>Maya</i> =Hull:		Piza Nephews & Co.	1,200	Robert Badenhop & Co., Inc.	64,800
G. Amsinck & Co.	3,500	AFRICANS.		Edward Maurer & Co., Inc.	48,000
Meyer Hecht	220	DECEMBER 18.—By the <i>Buffalo</i> =Hull:		United Malaysian Rubber Co.	2,800
JANUARY 2.—By the <i>Ancon</i> =Cristobal:		Aldens' Successors, Ltd.	113,100	Mexican Crude Rubber Co.	15,000
J. S. Sembrada & Co.	28,150	Charles T. Wilson Co., Inc.	12,600	W. Statson	6,900
A. M. Capen's Sons	6,900	DECEMBER 18. By the <i>Maya</i> =Hull:		L. Littlejohn & Co.	1,102,500
Pablo Calvet & Co.	15,950	Various	30,000	Arnold & Zeiss	358,000
D. C. Andrews & Co.	1,400	DECEMBER 20. By the <i>Maya</i> =Hull:		William H. Stiles	70,000
Heilbron, Wolf & Co.	2,600	Aldens' Successors, Ltd.	164,800	DECEMBER 26. By the <i>Maya</i> =Hull:	
Mecke & Co.	2,300	Robert Badenhop & Co., Inc.	9,800	Raw Products Co.	22,000
G. Amsinck & Co.	18,800	DECEMBER 29.—By the <i>Chicago</i> =Bordeaux:		Goodyear Tire & Rubber Co.	207,000
Lawrence Turnure & Co.	6,250	William H. Stiles	13,500	L. Littlejohn & Co.	38,000
Andean Trading Co.	6,800	JANUARY 2.—By the <i>Maya</i> =Hull:		Fred. Stern & Co.	27,000
Lawrence Johnson & Co.	11,000	Aldens' Successors, Ltd.	165,000	DECEMBER 26. By the <i>Maya</i> =Hull:	
L. Touse & Co.	4,700	Robert Badenhop & Co., Inc.	30,800	The B. F. Goodrich Co.	340,000
Dumarest Bros.	4,150	Robinson & Co.	10,500	Aldens' Successors, Ltd.	251,000
JANUARY 5.—By the <i>Carrillo</i> =Cartagena:		JANUARY 5.—By the <i>Ansonia</i> =London:		Arnold & Zeiss	68,000
G. Amsinck & Co.	10,450	Aldens' Successors, Ltd.	31,000	Michelin Tire Co.	57,500
JANUARY 8. By the <i>Esperanza</i> =Vera Cruz:		JANUARY 9.—By the <i>Gogso</i> =Lisbon:		L. Littlejohn & Co.	147,000
C. Tennant Sons & Co.	64,750	William H. Stiles	90,000	Various	51,000
Vera Cruz Trading Co.	350	JANUARY 15.—By the <i>Minnehaha</i> =London:		DECEMBER 27.—By the <i>Carmania</i> =Liverpool:	
The Canada-Mexico Corporation	1,050	Aldens' Successors, Ltd.	132,000	Various	25,000
J. A. Medina & Co.	1,220	JANUARY 16.—By the <i>Monadnock</i> =Bordeaux:		DECEMBER 27.—By the <i>Valeria</i> =London:	
H. Marquardt & Co.	520	Rubber Trading Co.	11,200	L. Littlejohn & Co.	89,560
JANUARY 10.—By the <i>Colon</i> =Cristobal:		Various	170,200	JANUARY 2.—By the <i>Manchuria</i> =London:	
G. Amsinck & Co.	15,500	JANUARY 23. By the <i>Oberon</i> =Lisbon:		Charles T. Wilson Co., Inc.	162,000
Lawrence Turnure & Co.	1,650	Edward Maurer & Co., Inc.	125,500	Hagemeyer Trading Co.	29,000
Lawrence Johnson & Co.	400	JANUARY 25.—By the <i>Colorado</i> =Hull:		Raw Products Co.	35,900
Henry W. Peabody	1,200	Hagemeyer Trading Co.	22,400	Rubber Trading Co.	21,000
Comacho, Roldan & Van Sichel	2,750	JANUARY 26. By the <i>Oregon</i> =Lisbon:		Goodyear Tire & Rubber Co.	189,900
Pablo Calvet & Co.	21,000	Various	160,000	L. Littlejohn & Co.	120,900
L. Touse & Co.	3,200	MANICOBAS.		Edward Maurer & Co., Inc.	17,500
Dumarest Bros.	1,400	DECEMBER 3. By the <i>Kachua</i> =Batavia:		Fred. Stern & Co.	93,000
Otto Gerdaun & Co.	12,100	Adolph Hirsch & Co.	16,500	Various	49,900
J. S. Sembrada & Co.	6,350	DECEMBER 31.—By the <i>Atahualpa</i> =Ceara:		JANUARY 2.—By the <i>St. Louis</i> =Liverpool:	
A. M. Capen's Sons	6,050	J. H. Rosslach & Bros.	49,500	Robinson & Co.	1,000
Mecke & Co.	2,750	JANUARY 5.—By the <i>Cuthbert</i> =Para:		JANUARY 5.—By the <i>Ansonia</i> =London:	
Lanman & Kemp	2,750	Hagemeyer Trading Co.	57,000	Edward Maurer & Co., Inc.	6,881
Piza Nephews & Co.	1,750	JANUARY 8. By the <i>Sao Paulo</i> =Santos:		JANUARY 6.—By the <i>Andania</i> =London:	
Pottberg, Ebeling & Co.	200	Various	97,500	Arnold & Zeiss	22,000
Various	19,100	JANUARY 12. By the <i>Matura</i> =Pernambuco:		JANUARY 6.—By the <i>Egremont Castle</i> =Singapore:	
JANUARY 13. By the <i>Santa Marta</i> =Cartagena:		Midleton & Co.	1,900	I. T. Johnstone & Co.	378,000
Pablo Calvet & Co.	550	R. Van Wolterbeck	850	Rubber Trading Co.	26,000
Andean Trading Co.	5,700	JANUARY 24.—By the <i>Hubert</i> =Ceara:		Aldens' Successors, Ltd.	30,000
A. Held	750	J. H. Rosenthal & Bros.	5,500	Henderson & Korn	454,500
JANUARY 15.—By the <i>Sixola</i> =Puerto Cortez:		PLANTATIONS.		United States Rubber Co.	103,000
G. Amsinck & Co.	100	DECEMBER 18.—By the <i>Mesaba</i> =London:		Charles T. Wilson Co., Inc.	13,600
Eggers & Herylein	750	Charles T. Wilson Co., Inc.	9,000	W. R. Grace & Co.	57,000
J. S. Sembrada & Co.	2,950	Rubber Trading Co.	1,600	Goodyear Tire & Rubber Co.	86,000
JANUARY 16.—By the <i>Metapan</i> =Port Limon:		L. Littlejohn & Co.	113,000	L. Littlejohn & Co.	915,000
Fruit Dispatch Co.	750	Fred. Stern & Co.	8,000	Arthur Meyer & Co.	93,000
Isaac Brandon & Bros.	550	DECEMBER 18.—By the <i>Kandahar</i> =Colombo:		East Asiatic Co.	220,000
JANUARY 18. By the <i>Almirante</i> =Cartagena:		L. Littlejohn & Co.	208,000	Edward Maurer & Co., Inc.	33,000
Pablo Calvet & Co.	950	William H. Stiles	57,000	Robinson & Co.	154,000
Muller, Schell & Co.	3,300	Various	762,000	Fred. Stern & Co.	167,600
G. Amsinck & Co.	5,150	DECEMBER 19. By the <i>Adriatic</i> =Liverpool:		William H. Stiles	45,000
R. del Castillo Co.	1,750	Various	5,000	Meyer & Brown	95,000
JANUARY 18.—By the <i>Caracas</i> =Puerto Cabello:		DECEMBER 20.—By the <i>Madiocn</i> =Batavia:		Fox & Co.	33,000
Scholtz & Co.	1,540	General Rubber Co.	378,000	Arnold & Zeiss	150,700
JANUARY 18. By the <i>Alamo</i> =Cristobal:		G. Amsinck & Co.	279,000	DECEMBER 3. By the <i>Maya</i> =Hull:	
G. Amsinck & Co.	4,950	I. T. Johnstone & Co.	2,900	William H. Stiles	37,000
Neuss, Hesslein & Co.	3,800	Meyer & Brown	1,000	Various	229,700
R. G. Barthold & Co.	400	Stein, Hirsch & Co.	32,500	JANUARY 9.—By the <i>Gogso</i> =Lisbon:	
Meyer Hecht	200	Aldens' Successors, Ltd.	5,000	Various	181,000
Gontard & Co.	8,350	Manhattan Rubber Mfg. Co.	33,000	JANUARY 9.—By the <i>Foyle</i> =London:	
American Trading Co.	6,700	The B. F. Goodrich Co.	29,000	I. T. Johnstone & Co.	83,900
Isaac Brandon & Bros.	400	L. Littlejohn & Co.	201,600	Raw Products Co.	6,700
Fidanque Bros. & Co.	550	Raw Products Co.	11,800	Firestone Tire & Rubber Co.	800
JANUARY 22.—By the <i>Pastores</i> =Port Limon:		East Asiatic Co.	17,000	Aldens' Successors, Ltd.	289,000
Isaac Brandon & Bros.	650	Various	1,850,000	Hagemeyer Trading Co.	18,600
JANUARY 22.—By the <i>Monterey</i> =Tampico:		DECEMBER 19. By the <i>Adriatic</i> =Liverpool:		L. Littlejohn & Co.	11,000
C. Tennant Sons & Co.	38,700	Various	5,000	Meyer & Brown	63,500
H. Marquardt & Co.	1,500	DECEMBER 20.—By the <i>Madiocn</i> =Batavia:		Arnold & Zeiss	47,000
Various	14,700	General Rubber Co.	378,000	Herman Weber	6,000
JANUARY 22. By the <i>Monterey</i> =Vera Cruz:		G. Amsinck & Co.	279,000	Fuchs & Lang	1,000
G. Schumann & Co.	2,600	I. T. Johnstone & Co.	2,900	Various	183,700
U. S. Brokerage	100	Meyer & Brown	1,000		

POUNDS.		POUNDS.
JANUARY 12.—By the <i>Colon</i> =Cristobal:		
J. T. Johnstone & Co.....	100,700	
Charles T. Wilson Co., Inc.....	13,700	
Alfred S. Jones & Co., Ltd.....	6,000	
Rubber Trading Co.....	6,000	
Goodyear Tire & Rubber Co.....	10,800	
L. Littlejohn & Co.....	200,600	
Meyer & Brown.....	67,000	
East Asiatic Co.....	34,800	
Arthur Meyer & Co.....	7,000	
Arnold & Zeiss.....	13,000	
William H. Stiles.....	118,000	
W. R. Grace & Co.....	56,000	683,300

POUNDS.		POUNDS.
JANUARY 13.—By the <i>Crown of Navarre</i> =Ciudad Bolivar:		
Hagemeyer Trading Co.....	24,100	
William H. Stiles.....	47,000	
W. R. Grace & Co.....	1,000	
Various.....	214,900	1,123,500

POUNDS.		POUNDS.
JANUARY 15.—By the <i>Finland</i> =Liverpool:		
Aldens' Successors, Ltd.....	284,000	
L. Littlejohn & Co.....	34,600	
Goodyear Tire & Rubber Co.....	381,000	
Michelin Tire Co.....	90,500	
Arnold & Zeiss.....	65,700	
Arthur Meyer & Co.....	29,900	
Fred Stern & Co.....	1,800	
Various.....	214,900	1,123,500

POUNDS.		POUNDS.
JANUARY 15.—By the <i>Pannonia</i> =Liverpool:		
General Rubber Co.....	33,600	
J. T. Johnstone & Co.....	102,000	
Henderson & Korn.....	260,600	
William H. Stiles.....	11,000	
Charles T. Wilson Co., Inc.....	38,000	
L. Littlejohn & Co.....	184,900	
Robinson & Co.....	25,000	
Arthur Meyer & Co.....	22,000	
Arnold & Zeiss.....	67,500	
East Asiatic Co.....	17,600	
W. R. Grace & Co.....	8,900	
Fred. Stern & Co.....	1,800	
Hagemeyer Trading Co.....	17,000	
Edward Maurer & Co., Inc.....	1,700	791,600

POUNDS.		POUNDS.
JANUARY 16.—By the <i>Finland</i> =Liverpool:		
Various.....	1,000	

POUNDS.		POUNDS.
JANUARY 19.—By the <i>Orduna</i> =Liverpool:		
Various.....	25,300	

POUNDS.		POUNDS.
JANUARY 19.—By the <i>Pannonia</i> =Liverpool:		
Rubber Trading Co.....	10,500	
The B. F. Goodrich Co.....	339,000	
Hagemeyer Trading Co.....	63,000	
J. T. Johnstone & Co.....	270,000	
United States Rubber Co.....	115,000	
Michelin Tire Co.....	130,600	
Robinson & Co.....	55,000	
L. Littlejohn & Co.....	90,500	1,073,600

POUNDS.		POUNDS.
JANUARY 14.—By the <i>Colon</i> =Cristobal:		
General Rubber Co.....	786,500	
J. T. Johnstone & Co.....	2,900	
Raw Products Co.....	29,000	
Hagemeyer Trading Co.....	19,000	
Winter & Sons.....	1,000	
Ned. Handel Maatschappij.....	3,900	
Ned. Handel Maatschappij.....	103,900	
Rowe-White Co., Ltd.....	5,500	
G. Amsinck & Co.....	272,500	
Meyer & Brown.....	21,000	
L. Littlejohn & Co.....	2,700	
Charles F. Smellie & Co.....	167,500	
East Asiatic Co., Ltd.....	17,600	
Stein, Hirsch & Co.....	57,000	
Hartman Bros., Inc.....	1,600	
Everett, Carleton & Co.....	32,000	
W. R. Grace & Co.....	29,000	
Various.....	2,192,600	3,745,200

POUNDS.		POUNDS.
JANUARY 14.—By the <i>Colon</i> =Cristobal:		
General Rubber Co.....	786,500	
J. T. Johnstone & Co.....	2,900	
Raw Products Co.....	29,000	
Hagemeyer Trading Co.....	19,000	
Winter & Sons.....	1,000	
Ned. Handel Maatschappij.....	3,900	
Ned. Handel Maatschappij.....	103,900	
Rowe-White Co., Ltd.....	5,500	
G. Amsinck & Co.....	272,500	
Meyer & Brown.....	21,000	
L. Littlejohn & Co.....	2,700	
Charles F. Smellie & Co.....	167,500	
East Asiatic Co., Ltd.....	17,600	
Stein, Hirsch & Co.....	57,000	
Hartman Bros., Inc.....	1,600	
Everett, Carleton & Co.....	32,000	
W. R. Grace & Co.....	29,000	
Various.....	2,192,600	3,745,200

POUNDS.		POUNDS.
JANUARY 14.—By the <i>Colon</i> =Cristobal:		
Various.....	7,900	

POUNDS.		POUNDS.
JANUARY 25.—By the <i>Manhattan</i> =London:		
Rubber Trading Co.....	12,000	
Hagemeyer Trading Co.....	9,500	
Thornett & Fehr.....	800	
W. R. Grace & Co.....	29,000	
Various.....	16,000	83,300

POUNDS.		POUNDS.
JANUARY 26.—By the <i>Philadelphian</i> =London:		
Goodyear Tire & Rubber Co.....	151,000	

POUNDS.		POUNDS.
JANUARY 26.—By the <i>Philadelphian</i> =London:		
Various.....	1,000	

POUNDS.		POUNDS.
JANUARY 26.—By the <i>Philadelphian</i> =London:		
Various.....	1,000	

POUNDS.		POUNDS.
JANUARY 26.—By the <i>Philadelphian</i> =London:		
Various.....	1,000	

POUNDS.		POUNDS.
JANUARY 26.—By the <i>Philadelphian</i> =London:		
Various.....	1,000	

POUNDS.		POUNDS.
JANUARY 26.—By the <i>Philadelphian</i> =London:		
Various.....	1,000	

POUNDS.		POUNDS.
JANUARY 26.—By the <i>Philadelphian</i> =London:		
Various.....	1,000	

POUNDS.		POUNDS.
JANUARY 26.—By the <i>Philadelphian</i> =London:		
Various.....	1,000	

POUNDS.		POUNDS.
JANUARY 26.—By the <i>Philadelphian</i> =London:		
Various.....	1,000	

POUNDS.		POUNDS.
DECEMBER 27.—By the <i>Panama</i> =Cristobal:		
Gontard & Co.....	8,280	

POUNDS.		POUNDS.
JANUARY 5.—By the <i>Carrillo</i> =Cartagena:		
G. Amsinck & Co.....	1,200	

POUNDS.		POUNDS.
JANUARY 8.—By the <i>Tenadores</i> =Bocas del Toro:		
H. Marquardt & Co.....	3,680	
Eggers & Heinlein.....	1,840	
Gontard & Co.....	6,670	12,190

POUNDS.		POUNDS.
JANUARY 9.—By the <i>Arctico</i> =Demerara:		
Middleton & Co.....	11,000	
Edward Maurer & Co., Inc.....	19,800	
J. P. Watson.....	13,200	44,000

POUNDS.		POUNDS.
JANUARY 10.—By the <i>Colon</i> =Cristobal:		
G. Amsinck & Co.....	15,870	
Mecke & Co.....	15,180	
J. S. Sembrada & Co.....	7,360	
Pablo Calvet & Co.....	13,110	
A. M. Capen's Sons.....	28,060	
D. C. Andrews & Co.....	10,580	
Muller, Schall & Co.....	690	
Piza, Nephews & Co.....	690	
Gontard & Co.....	2,300	
M. A. de Leon & Co.....	13,800	107,640

POUNDS.		POUNDS.
JANUARY 13.—By the <i>Crown of Navarre</i> =Ciudad Bolivar:		
General Export & Commission Co.....	26,000	
American Trading Co.....	3,360	
Yglesias, Lobo & Co.....	8,400	37,760

POUNDS.		POUNDS.
JANUARY 18.—By the <i>Advance</i> =Cristobal:		
Isaac Brandon & Bros.....	1,840	
C. E. Griffin.....	8,510	
Fidanque Bros. & Co.....	9,890	20,240

POUNDS.		POUNDS.
JANUARY 22.—By the <i>Pastores</i> =Bocas del Toro:		
Gontard & Co.....	7,820	
H. Marquardt & Co.....	8,050	
Eggers & Heinlein.....	230	16,100

POUNDS.		POUNDS.
JANUARY 23.—By the <i>Panama</i> =Cristobal:		
J. S. Sembrada & Co.....	10,200	
G. Amsinck & Co.....	5,000	
A. M. Capen's Sons.....	3,100	
Pottberg, Ebeling & Co.....	11,000	
M. A. de Leon & Co.....	13,200	
Piza, Nephews & Co.....	650	
Mecke & Co.....	10,000	53,150

POUNDS.		POUNDS.
JANUARY 23.—By the <i>Crown of Cordova</i> =Ciudad Bolivar:		
Yglesias, Lobo & Co.....	19,000	
Various.....	6,000	25,000

POUNDS.		POUNDS.
JANUARY 25.—By the <i>Prinz Frederick Hendrik</i> =Paramaribo:		
R. Van Walterbeck.....	2,200	

POUNDS.		POUNDS.
JANUARY 25.—By the <i>Steinstad</i> =Guyanaquil:		
Otto Gerdaun.....	300	
Pottberg, Ebeling & Co.....	4,800	
M. A. de Leon & Co.....	6,000	11,100

CRUDE RUBBER ARRIVALS AT SEATTLE.

Crude rubber arrivals at Seattle by express, 130 pounds net to the car.

PLANTATION.

TO SEATTLE.

POUNDS.		POUNDS.
DECEMBER 24.—By the steamer <i>Yokohama Maru</i> :		
W. R. Grace & Co.....		
Sandilands Buttery & Co.....	3,900	

POUNDS.		POUNDS.
DECEMBER 26.—By the steamer <i>Tensho Maru</i> :		
The B. F. Goodrich Co.....	427,180	
Firestone Tire & Rubber Co.....		
The Waterhouse Co.....	194,480	
W. R. Grace & Co.....		
Penang Rubber Estate.....	11,050	632,710

POUNDS.		POUNDS.
JANUARY 22.—By the steamer <i>Empress of Russia</i> :		
Goodyear Tire & Rubber Co.....	8,300	
British Consul General.....		
The Pelmadulla R. Co.....	700	

POUNDS.		POUNDS.
JANUARY 22.—By the steamer <i>Empress of Russia</i> :		
Goodyear Tire & Rubber Co.....	8,300	
British Consul General.....		
The Pelmadulla R. Co.....	700	

POUNDS.		POUNDS.
JANUARY 22.—By the steamer <i>Empress of Russia</i> :		
Goodyear Tire & Rubber Co.....	8,300	
British Consul General.....		
The Pelmadulla R. Co.....	700	

POUNDS.		POUNDS.
JANUARY 22.—By the steamer <i>Empress of Russia</i> :		
Goodyear Tire & Rubber Co.....	8,300	
British Consul General.....		
The Pelmadulla R. Co.....	700	

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JANUARY 22.—By the steamer <i>Empress of Russia</i> :		
Goodyear Tire & Rubber Co.....	8,300	
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The Pelmadulla R. Co.....	700	

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Goodyear Tire & Rubber Co.....	8,300	
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POUNDS.		POUNDS.
JANUARY 22.—By the steamer <i>Empress of Russia</i> :		
Goodyear Tire & Rubber Co.....	8,300	
British Consul General.....		
The Pelmadulla R. Co.....	700	

POUNDS.		POUNDS.
JANUARY 22.—By the steamer <i>Empress of Russia</i> :		
Goodyear Tire & Rubber Co.....	8,300	
British Consul General.....		
The Pelmadulla R. Co.....	700	

POUNDS.		POUNDS.
JANUARY 22.—By the steamer <i>Empress of Russia</i> :		
Goodyear Tire & Rubber Co.....	8,300	
British Consul General.....		
The Pelmadulla R. Co.....	700	

POUNDS.		POUNDS.
JANUARY 22.—By the steamer <i>Empress of Russia</i> :		
Goodyear Tire & Rubber Co.....	8,300	
British Consul General.....		
The Pelmadulla R. Co.....	700	

POUNDS.		POUNDS.
JANUARY 22.—By the steamer <i>Empress of Russia</i> :		
Goodyear Tire & Rubber Co.....	8,300	
British Consul General.....		
The Pelmadulla R. Co.....	700	

POUNDS.		POUNDS.
JANUARY 22.—By the steamer <i>Empress of Russia</i> :		
Goodyear Tire & Rubber Co.....	8,300	
British Consul General.....		
The Pelmadulla R. Co.....	700	

POUNDS.		POUNDS.
JANUARY 18.—By the steamer <i>Gishun Maru</i> :		
Goodyear Tire & Rubber Co.....		
Penang Rubber Estate.....	19,500	

POUNDS.		POUNDS.
JANUARY 18.—By the steamer <i>Gishun Maru</i> :		
Goodyear Tire & Rubber Co.....		
Penang Rubber Estate.....	19,500	

POUNDS.		POUNDS.
JANUARY 18.—By the steamer <i>Gishun Maru</i> :		
Goodyear Tire & Rubber Co.....		
Penang Rubber Estate.....	19,500	

POUNDS.		POUNDS.
JANUARY 18.—By the steamer <i>Gishun Maru</i> :		
Goodyear Tire & Rubber Co.....		
Penang Rubber Estate.....	19,500	

POUNDS.		POUNDS.
JANUARY 18.—By the steamer <i>Gishun Maru</i> :		
Goodyear Tire & Rubber Co.....		
Penang Rubber Estate.....	19,500	

IMPORTS AND EXPORTS OF CRUDE AND MANUFACTURED RUBBER AT THE PORT OF NEW YORK.

Week Ending—	India Rubber		Scrap for Re-manufacture.		Latex.		Gutta Percha.		Gutta Jelutong.	
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
December 22, 1916....	3,949,676	\$8,476*	353,799	\$23,910	52,068	\$25,002				
December 29, 1916....	4,278,006	2,291,942	33,881	2,227	12,518	5,486	15,022	\$1,500	29,000	\$13,152
January 5, 1917....	9,906,512	5,088,983	358,484	23,089	55,085	27,075	27,000	3,113	1,339,856	\$8,088
January 12, 1917....	4,927,107	2,588,419	78,325	5,160	83,461	40,825				

*Manufactures of India Rubber. †Manufactures of Gutta Percha.

In addition to the above 103,632 pounds of chicle was imported, valued at \$49,905.

EXPORTS.

FIGURES ISSUED FROM DECEMBER 26 TO JANUARY 25, 1917.

EXPORTED TO	Belting, Hose and Packing.	Footwear.		Tires.		Insulated Wire and Cables.	Other mnf. of India Rubber.	Fountain Pens.	Chewing Gum.	Reclaimed Rubber.	Scrap Rubber.
		Boots.	Shoes.	Auto.	Other.						
NORTH AMERICA:											
Bermuda.....	\$37	\$19			\$90	\$89	\$320		\$232		
British Honduras.....							76		90		
Canada.....							2	\$79			
Central American States—											
Costa Rica.....	1,254			\$616	40	12	3,008		1,699		
Guatemala.....	993			8,183	163	941	548		75		
Honduras.....	11			619		100	1,502		18		
Nicaragua.....	17					384	1,224		20		
Panama.....	3,850	50	\$230	10,664	3,833	6,016	4,015	119	2,910		
Salvador.....	171			4,129		724	3,683		281		
Mexico.....	7,679			5,851	2,528	15,074	5,213	14	210	\$323	
Newfoundland.....	60	\$2,860	1,797	289		480	884	3	1,559		
West Indies—											
British—											
Barbados.....	141		6	853	892		299	49			
Jamaica.....	515	11	235	2,858	2,227	196	1,216				
Trinidad and Tobago.....	360	8		4,659	7	678	1,547				
Other British.....	407		283	1,985	803	800	555	8			
Cuba.....	20,987		517	36,026	3,409	8,119	20,300	4,764	1,402		
Danish.....	147		49	26			193	2			
Dutch.....	77			281	49		611	2	15		
French.....	324			586	427	167	22		4		
Haiti.....	111			52		46	598	4	10		
Santo Domingo.....	254		176	1,905	635	239	2,322	19	235		
Totals, North America.	\$37,877	\$22,948	\$3,293	\$78,982	\$15,107	\$106,065	\$48,148	\$5,063	\$9,476	\$323	
EUROPE:											
Denmark.....							\$769		\$268		
France.....	\$1,465	510	\$3,988	\$1,484	\$26,511	\$182,687	91,897	200	\$2,708		
Gibraltar.....							45				
Italy.....	524					4,894	2,148				
Netherlands.....						3,842					
Norway.....	5,685					39,293	1,543		264		
Portugal.....	3,042						109				
Russia.....						8,606	1,650				
Spain.....	1,148						1,903		1,651		
Sweden.....							12,436				
Switzerland.....						1,420					
United Kingdom—											
England.....	46,318	8,757	11,404	412,670	535,170	119,394	186,428	348	42,480	\$3,600	\$4,422
Scotland.....	12,765						56		6,000		12,531
Totals, Europe.	\$70,047	\$9,269	\$15,392	\$416,127	\$561,681	\$373,885	\$287,423	\$2,469	\$51,452	\$3,600	\$16,953
SOUTH AMERICA:											
Argentina.....	\$14,111		\$779	\$127,701	\$13,260	\$21,871	\$15,598		\$108		
Bolivia.....	94			1,046	53		283		\$120		
Brazil.....	8,085		1,443	73,778		25,148	11,692		119		
Chile.....	1,016		230	9,561	234	18,826	10,144		294		\$759
Colombia.....	944		322	2,513	400	5,373	2,643	149			
Ecuador.....	344		366	1,008		441	3,044	4	222		
Guiana—British.....				1,615	18	34	138				
French.....				510			13				
Paraguay.....				5			9				
Peru.....	6,637	1,039		766	242	2,864	5,634	186	1,279		
Uruguay.....	64		1,025	4,038							
Venezuela.....	1,228		52	12,887	1,803	1,484	5,853				
Totals, South America.	\$49,878	\$1,039	\$4,416	\$235,428	\$15,869	\$83,901	\$58,439	\$468	\$2,022		\$759
ASIA:											
China.....	\$774		\$93			\$8,216	\$458	\$70	\$40		
British India.....	385			\$16,025	1,709	1,338	1,019	241	362		
Strait Settlements.....	16		55	598	94		81				
Dutch East Indies.....				680		7,440	7				
French East Indies.....							130				
Hongkong.....							122				
Japan.....	883		332			4,076	2,513				
Total Asia.	\$2,051		\$480	\$17,603	\$1,803	\$91,079	\$4,330	\$311	\$402	\$693	
OCEANIA:											
British—											
Australia and Tasmania.....	\$2,685	\$912	\$7,315	\$30,726		\$3,222	\$6,199		\$1,061		
New Zealand.....	391	1,835	613	2,098		211	1,154		119		
Philippine Islands.....	4,656			1,691		1,694	2,446		200		
Totals, Oceania.	\$7,732	\$2,747	\$8,228	\$34,515	\$6	\$5,127	\$9,799		\$1,380		
AFRICA:											
British Africa.....											
West.....			\$10	\$146			30				
South.....	\$25,127	\$2,417	1,817	26,144	\$1,100	\$421	7,213		\$1,077		
East.....				3,732			251				
Cape Verde Islands.....								\$16			
Madagascar.....			5								
Italian Africa.....				174							
Portuguese Africa.....	1,784						28				
Totals, Africa.	\$26,911	\$2,417	\$1,832	\$30,196	\$1,100	\$421	\$7,501	\$16	\$1,077		

In addition to the above the following items were exported during the same period: To England—Latex, \$1,673; India Rubber, \$1,310; to Santo Domingo—India Rubber, \$98.

RUBBER STATISTICS FOR THE UNITED STATES.

IMPORTS OF CRUDE AND MANUFACTURED RUBBER.

	November, 1916.	
	Pounds.	Value.
UNMANUFACTURED—free		
India rubber		
Belting	152,636	\$63,894
Hose		
Tires		
Other rubber goods	5,289,168	2,870,357
Central America and British Honduras		
Belting	77,990	32,402
Hose	144,246	64,993
Tires	3,978,007	1,927,109
Other rubber goods	253,580	110,840
East Indies	2,644,480	5,020,279
Other countries	10,156	4,757

Totals	19,547,263	\$10,094,541
Balata	250,374	143,114
Gutta percha	144,060	32,295
Gutta jelutong	1,265,829	89,442
Gutta percha	4,437	582

Totals	21,511,993	\$10,359,974
Rubber scrap	1,670,864	102,581
Totals, unmanufactured	23,182,857	\$10,462,555

MANUFACTURED—dutiable	\$75,905	\$293,672
Gutta percha		\$1,037
India rubber		71,950
Totals, manufactured		\$72,987
Substitutes—elasticon, etc.		\$2,085

EXPORTS OF DOMESTIC MERCHANDISE.

	November, 1916.	
	Pounds.	Value.
MANUFACTURED—free		
Automobile tires:		
England		\$393,547
Canada		46,338
Mexico		17,168
Cuba		56,123
Australia		24,537
New Zealand		25,199
Philippine Islands		29,805
Other countries		351,662
Total		\$944,379
All other tires		128,716
Belting, hose and packing		217,370
Rubber boots	148,367	438,781
Rubber shoes	518,888	252,866
Scrap and old rubber	259,650	46,351
Reclaimed rubber	368,337	59,171
Other rubber manufactures		655,676
Totals, manufactured		\$2,743,310
Foreign pen	14,462	\$10,786

EXPORTS OF FOREIGN MERCHANDISE.

	November, 1916.	
	Pounds.	Value.
UNMANUFACTURED—free		
Balata	26,689	\$14,143
Gutta percha		
Gutta jelutong		
Gutta percha		
India rubber	421,570	250,656
Rubber scrap and refuse		
Totals, unmanufactured	448,259	\$264,799
Chicle	3,462	\$1,133

EXPORTS OF RUBBER GOODS TO NON-CONTIGUOUS TERRITORIES OF THE UNITED STATES.

	November, 1916.	
	Quantity.	Value.
MANUFACTURED—free		
Alaska:		
Belting, hose and packing		\$5,852
Boots and shoes	6,062	9,575
Other rubber goods		1,789
Total	6,062	\$17,216
Hawaii:		
Belting, hose and packing		\$7,709
Automobile tires		44,026
Other tires		5,891
Other rubber goods		21,345
Total		\$78,971
Philippine Islands:		
Belting, hose and packing		\$9,287
Boots and shoes	3,380	24,244

Tires	34,586
Other rubber goods	9,926
Total	33,980

Porto Rico:	
Belting, hose and packing	\$8,421
Automobile tires	53,428
Other tires	750
Other rubber goods	9,842
Total	\$72,441

* Dutiable beginning July 1, 1916.

RUBBER STATISTICS FOR THE DOMINION OF CANADA.

IMPORTS OF CRUDE AND MANUFACTURED RUBBER.

	October, 1916.	
	Pounds.	Value.
UNMANUFACTURED—free		
Rubber and gutta percha, crude		
From:		
Great Britain	399,537	\$220,092
United States	260,941	132,589
Straits Settlements	94,895	53,524
Totals	755,373	\$406,205
Rubber, recovered:		
Great Britain	200	\$49
United States	260,337	46,406
Totals	260,537	\$46,455

Hand rubber, in sheets and rods		
United States	829	\$774
Rubber substitute:		
United States	67,663	\$6,773

Rubber, powdered, and rubber or gutta percha waste:		
Great Britain	147,240	\$5,908
United States	83,786	4,219
Other countries	3,603	266
Totals	234,629	\$10,393

Rubber thread, not covered:		
United States	1,912	\$2,968
Balata, crude:		
United States	4,648	\$3,764

Chicle, crude:		
British Honduras	92,218	\$99,377
Mexico	248,958	89,418
Totals	216,788	77,685

Totals	757,964	\$266,380
MANUFACTURED—dutiable:		
General Tariff.		
Boots and shoes:		
From:		
United States	\$15,241	
Belting:		
United States	\$5,584	
Waterproof clothing:		
Great Britain	\$38,046	
United States	\$12,189	
Totals	\$12,189	\$38,046

Hose, lined with rubber:		
Great Britain	\$59	
United States	\$10,520	
Totals	\$10,520	\$59

Mats and matting:		
United States	\$202	
Packing:		
Great Britain	\$7	
United States	\$6,001	
Totals	\$6,001	\$7

Tires of rubber for all vehicles:		
Great Britain	\$11,970	\$379
United States	126,861	
France	643	
Totals	\$139,474	\$379

Rubber cement and all other manufactures of india rubber and gutta percha, N. O. P.:		
Great Britain	\$550	\$11,323
United States	52,415	
Other countries	83	
Totals	\$53,048	\$11,323

Webbing—over one inch wide:		
Great Britain	\$1,241	
United States	\$22,145	
Totals	\$22,145	\$1,241

EXPORTS OF DOMESTIC AND FOREIGN RUBBER GOODS.

October, 1916.

	October, 1916.	
	Prod-uce of Canada.	ReExports of Foreign Goods.
MANUFACTURED—		
Hose:		
To—		
Great Britain	\$4,095	
Newfoundland	322	
Other countries	13,370	
Totals	\$17,787	

Boots and shoes:		
To—		
Great Britain	\$102,096	
United States	231	
Newfoundland	29,363	
Australia	1,572	
New Zealand	3,389	
Other countries	1,318	
Totals	\$137,969	

Totals	\$39,710	\$1,042
United States	2,090	
Other countries	9,179	
Totals	\$50,979	\$1,042

Rubber waste:		
To—		
United States	\$22,875	
All other manufactures, N. O. P.:		
To—		
Great Britain	\$6,512	
United States	196	\$512
Newfoundland	150	
New Zealand	592	
Other countries	292	
Totals	\$7,742	\$512

† Gum chicle:		
United States	\$231,147	

* During October 313,700 pounds of rubber waste was exported to the United States.		
† During October 425,746 pounds of gum chicle was exported to the United States.		

Totals	\$231,147	
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Totals	\$7,742	\$512
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Totals	\$231,147	
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Totals	\$7,742	\$512
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RUBBER STATISTICS FOR ITALY.

IMPORTS OF CRUDE AND MANUFACTURED RUBBER.

Nine Months Ending September, 1916.

	Pounds.		Value.	
UNMANUFACTURED—				
raw and reclaimed:				
From—				
Great Britain	2,937,660			
Straits Settlements	1,150,820			
African French Colony	6,380			
Belgian Congo	219,120			
Brazil	3,767,060			
Other countries	1,249,600			
Totals	9,330,640		\$6,548,413	

Rubber scrap	5,280,440		\$416,915	
MANUFACTURED—				
India rubber and gutta percha threads:				
From—				
United States	45,100			
Great Britain	26,620			
Other countries	6,600			
Totals	78,320		\$137,416	

India rubber and gutta percha sheets:				
Cut sheets	3,520		\$5,250	
Flange fabric	1,760		695	
Insulated wire	440		116	
Hose	27,940		19,609	

India rubber and gutta percha tubes:				
Cut sheets	1,100		\$1,737	
Elastic fabric:				
German	220			
Other countries	10,340			
Totals	10,560		\$5,558	

Other manufactures	6,160		3,783	
Belting	101,420		47,281	
Rubber coated fabrics, pieces	97,020		119,158	

Boots and shoes—pairs:				
United States	23,294			
France	10,291			
Other countries	152			
Totals	33,737		\$32,556	

Elastic webbing:				
France	25,740			
Germany	880			
Other countries	24,200			
Totals	50,820		\$67,914	

Elastic fabric—not specified:	Pounds.	Value.	MANUFACTURED—	Pounds.	Value.	Elastic fabric—not specified:	Pounds.	Value.
From—			India rubber and gutta percha			To—		
France	217,580		—threads:			Spain	440	
Great Britain	106,920		To—			Argentina	22,000	
Other countries	8,140		France	7,700		Brazil	220	
Totals	332,640	\$262,634	Great Britain	9,900		Uruguay	1,760	
			Argentina	3,740		Other countries	12,100	
Tires:			Other countries	23,760		Totals	36,520	\$64,076
From—			Totals	45,100	\$81,110	Tires:		
France	1,162,260		India rubber and gutta percha			To—		
Great Britain	374,660		—sheets:			France	258,280	
Other countries	28,160		Cut sheets	4,840	\$7,218	Great Britain	3,268,100	
Totals	1,565,080	\$2,746,684	Elastic fabric	2,200	829	Switzerland	66,880	
Other rubber manufactures:			Inodated wire	880	232	India and Ceylon	353,540	
From—			Hard rubber	24,000	30,880	Australia	79,200	
United States	1,323,960		India rubber and gutta percha			Argentina	843,040	
France	897,160		—tubes:			Brazil	455,180	
Great Britain	749,760		Cut sheets	11,000	\$17,370	Other countries	459,580	
Other countries	1,100		Elastic fabric	95,040	50,026	Totals	5,783,800	\$10,148,940
Totals	2,971,980	\$2,085,790	Other forms	99,880	61,335	Other rubber manufactures:		
Total Imports		\$12,502,509	Belting	1,540	946	To—		
			Boots and shoes.....pairs	2	?	Great Britain	49,060	
			Elastic webbing:			Switzerland	47,300	
			To—			Argentina	82,940	
			France	7,260		Other countries	183,040	
			Greece	90,860		Totals	362,340	\$254,297
			Egypt	20,900		Total Exports		\$11,648,920
			Argentina	92,840				
			Brazil	80,540				
			China	28,160				
			Other countries	156,860				
			Totals	486,420	\$639,313			

EXPORTS OF CRUDE AND MANUFACTURED RUBBER.

UNMANUFACTURED—	Pounds.	Value.
India rubber and gutta percha		
—raw and reclaimed....	833,140	\$292,346

THE MARKET FOR COTTON AND OTHER FABRICS.

Copyright 1917

NEW YORK.

AMERICAN COTTON. The January cotton market has been steady compared to the violent fluctuations of last December. The speculative markets are apparently not so sensitive to conflicting rumors of peace and international complications as they were a month ago. It is generally believed that the present level of prices will continue until the market is again affected by new crop reports or trade disturbances. There are, moreover, certain interests that predict a return of 20-cent cotton before spring, but two important bull movements are hardly to be expected in one season. On January 4, middling spot cotton was selling at 17.55 cents and reached 17.80 cents on January 8. After minor fluctuations in the interim, spot cotton was quoted at 17.40 cents on January 29.

EGYPTIAN COTTON. Reports by mail from Alexandria under date of December 15, 1916, indicate that the reaction from the advance which commenced early in the season has resulted in a weaker market and prices have declined. The spot market has been very irregular. Sakellarides is becoming scarce and full prices are being paid for spot lots. The demand for uppers has not weakened and prices have remained steady.

The exports of Egyptian cotton from Alexandria for the period September 1, 1915, to August 31, 1916, were 728,319 bales, approximating 800 pounds. The United States imported 184,544 bales; England, 355,699; Spain, 20,332; France, 45,812; Japan, 25,801; Italy, 52,516; Russia, 42,619; India, Portugal and Greece, 1,026.

SEA ISLAND COTTON. Quiet has prevailed in the southern markets during the past month and prices have remained practically unchanged. There has apparently been a fair amount of inquiries but the volume of actual business has been small. The crop in sight at all ports on January 19 was 69,727 bales against 61,372 bales for the same period a year ago.

TIRE FABRICS. Business continues good with numerous price inquiries for contracts covering the last half of 1917. The fabric mills are sold until the middle of next summer and this year will doubtless show a marked increase in production.

It is estimated that 115,000,000 pounds of building fabric went into the manufacture of tires during the season of 1915-16. Of this amount Egyptian fabric furnished 75,000,000 pounds; Sea Island fabric, 30,000,000 pounds; Long staple (American) Peelers fabric, 5,000,000 pounds; Sea Island and Egyptian Cord fabrics, 5,000,000 pounds. The amount of tire building fabric required for 1917 is estimated at 141,000,000 pounds.

MECHANICAL DUCK. The undertone of the market is easier

and prices have eased off about a cent a pound. There is a good domestic demand for this time of the year, the mills are behind on orders and supplies are not over-plentiful. The slump in cotton had little effect on the spot market but resulted in easier futures. The situation may be said to be generally easier.

SHEETINGS AND DRILLS. Wide sheetings, drills and twills continue to be in good demand, 50 and 52-inch particularly. Prices are firm and have not changed since a month ago.

RAINCOAT CLOTH. Business has been quiet, due to the weather and the fact that January is usually a quiet between-season month. Prospects of a good Spring business in raincoat cloth are indicated by the numerous inquiries being received at this time.

NEW YORK QUOTATIONS.

JANUARY 26, 1917.

Prices subject to change without notice.

Airplane and Balloon Fabrics:		
Wamsutta, S. A. I. L. No. 1, 40-inch.....yard	\$0.35	@
No. 4, 38½-inch.....yard	.35	@
Wool Stockinettes—52-inch:		
A—14-ounce	1.33	@
B—14-ounce	1.63	@
C—14-ounce	1.92	@
Cotton Stockinettes—52-inch:		
D—14-ounce .....	.55	@
E—11½-ounce .....	.46	@
F—14-ounce .....	.60	@
G—8-ounce .....	.52	@
H—11-ounce .....	.55	@
I—9-ounce .....	.46	@
Colors—white, black, blue, brown.		
Knitabac Stockinette	1.00	@ 1.05
Tire Fabrics:		
17¼-ounce Sea Island, combed.....square yard	1.25	@ 1.35
17¼-ounce Egyptian, combed.....	1.10	@ 1.15
17¼-ounce Egyptian, carded.....	1.07	@ 1.12
17¼-ounce Peelers, carded.....	.70	@
Sheeting:		
40-inch 2.35-yard .....	.15½	@
40-inch 2.50-yard .....	.14½	@
40-inch 2.70-yard .....	.14	@
40-inch 2.85-yard .....	.13	@
40-inch 3.15-yard .....	.12¾	@
Osnaburgs:		
40-inch 2.35-yard .....	.16½	@
40-inch 2.48-yard .....	.15	@
37½-in. 2.42-yard .....	.15½	@
Mechanical Ducks:		
Hose .....	.45	@ .55
Belting .....	.26	@ .47
Carriage Cloth Duck:		
38-inch 2.00-yard enameling duck.....yard	.20	@
38-inch 1.74 yard .....	.22	@
2-inch 16.66-ounce .....	.43½	@
72-inch 17.21-ounce .....	.45	@
Drills:		
38-inch 2.76 yard .....	.19	@
40-inch 2.47 yard .....	.15½	@
52-inch 1.90 yard .....	.20	@
52-inch 1.95-yard .....	.20	@
60-inch 1.53-yard .....	.26½	@
Yarns:		
Garden Hose, 12/2 cabled.....pound		Nominal
Fire Hose 12/1		Nominal
Imported Woollen Fabrics Specially Prepared for Rubberizing—Plain and Fancies:		
63-in. 3½ to 7½ ounces .....	.38	@ 1.55
36-inch, 2¼ to 5 ounces .....	.35	@ .85

Imported Plaid Lining (Union and Cotton):

36-inch, 2 to 4 ounces.....	.35 @	75
Domestic Worsteds Fabrics:		
36-inch, 3 3/4 to 5 ounces.....	.35 @	65
Raincoat Cloth (Cotton):		
Boatazine.....	.08 @	109
Twills.....	.12 @	18
Tweed.....	.25 @	35
Tweed, printed.....	.07 1/2 @	15
Flannel.....	.08 1/2 @	10
Repps.....	.24 @	27
Worlows.....		
12-7 1/2 ounce.....	100 yards	60
40-7 1/2 ounce.....		15
40-8 ounce.....		5
40-10 ounce.....		9.40
40-10 1/2 ounce.....		10
45-7 1/2 ounce.....		10

SEA ISLAND CROP MOVEMENT

FROM AUGUST 1 TO DECEMBER 29, 1916

	Receipts 1916-17	Receipts 1915-16
Stock on hand, August 1, 1916.....		2,382
Savannah, 9,431; Charleston, 1,700.....	37,150	32,786
Received at Charleston.....	2,586	3,814
Received at Jacksonville.....	27,701	19,025
Totals.....	69,945	58,007
Less Exports.....	58,724	40,396
Stock December 29, 1916—		
Savannah 9,431; Charleston, 1,700.....	11,221	17,611
Crop in sight at all ports to date.....	67,377	55,625

EXPORTS.

	Great Britain	Continent	Northern Mills.	Southern Mills.	Totals.
Savannah.....	889	120	25,739	3,372	30,120
Charleston.....			903		903
Jacksonville.....			27,701		27,701
Totals.....	889	120	54,343	3,372	58,724
1915-16.....	1,000	1,060	36,537	2,649	40,396

Inc. 739 Dec. 940 Inc. 17,806 Inc. 723 Inc. 18,328
In addition to the above movement, a large quantity of cotton has gone direct to Southern mills from interior points, and to Northern mills via Norfolk. While the exact figures are not available at present, it is conservatively estimated that the total amount of cotton so shipped is somewhere in the neighborhood of 12,000 bales.

EGYPTIAN COTTON CROP MOVEMENT

FROM AUGUST 1 TO DECEMBER 7, 1916

	1915-1916.	1914-1915.
France.....	120,235	63,639
Italy.....	74,110	65,948
Total shipments to Great Britain.....	185,802	186,183
France.....	12,102	15,143
Spain.....	17,117	21,995
Italy.....	15,258	20,481
Greece.....	13,046	11,920
Total shipments to Continent.....	52,223	61,932
To—		
United States.....	50,756	94,944
India.....	4,320	9,205
Total shipments to all parts.....	293,101	352,264
Total Crop (interior gross weight) cantars.....	4,726,518	4,473,720

(Compiled by Davies, Benachi & Co., Liverpool.)

THE MARKET FOR RUBBER SCRAP.

Copyright 1917.

NEW YORK

THERE has been very little interest shown in the rubber scrap market during the past month. The volume of actual business transacted has been small and the large buyers have been conspicuously absent. January is the season of the year when supplies are usually allowed to diminish in view of annual stock taking. Moreover, the difficulties attending railroad shipments have had a marked effect in depressing the general business situation. The easier tone of the market is therefore explained and the softening of prices is only a natural result of the prevailing adverse conditions. The continued activity of the rubber mills and reclaimers affords the belief that supplies have been greatly reduced and active buying will not be long deferred. Generally

speaking, prices have undergone comparatively few changes during the month and with few exceptions the revision was downward.

BOOTS AND SHOES. This has been the weakest material on the list and prices have declined 3/8 to 1/4 cent. Consumers have consistently refused to buy at the prevailing prices with the expectation of lower values. Trimmed and untrimmed arctics were easy, and despite minor fluctuations, prices are the same as quoted a month ago.

AUTO TIRES. The situation in tires has been devoid of interest and prices have eased off accordingly. G. & G. white tires are 1/4 cent lower than a month ago. Bicycle and solid tires were dull and unchanged.

INNER TUBES. There has been little doing in tubes and business has been limited to small orders as buyers are confident of securing better figures. The quiet conditions ruling in the crude rubber market doubtless explains the easy position of tubes. Prices have fluctuated during the month but are now about the same as a month ago.

London imports of waste and reclaimed rubber for December were 78,100 pounds, and Liverpool 179,400 pounds, as compared to 109,300 and 20,100 pounds, respectively, for November. Exports for December were as follows: London, 1,158,900 pounds; Liverpool, 303,200 pounds, as compared to 1,244,000 and 106,800 pounds for November.

NEW YORK QUOTATIONS FOR CARLOAD LOTS DELIVERED.

JANUARY 25, 1917.

Prices subject to change without notice.

	Per Pound.
Boots and shoes.....	10 1/2 @ .09 1/2
Trimmed arctics.....	.07 @ .07 1/2
Untrimmed arctics.....	.06 1/2 @ .06 3/4
White tires, Goodrich and Goodyear.....	.08 @ .08 1/2
Auto tires, standard white.....	.06 1/4 @ .06 1/2
standard mixed.....	.06 1/4 @ .06 1/2
stripped, unguaranteed.....	.04 1/2 @ .05
Auto peelings, No. 1.....	.09 1/2 @
No. 2.....	.08 1/2 @
Iron tires, No. 1.....	.25 @ .26
No. 2.....	.11 @
red.....	.11 @
Iron tires.....	.01 @
Bicycle tires.....	.01 @ .01 1/2
Solid tires.....	.05 1/2 @ .06
White scrap, No. 1.....	.13 1/2 @ .14
No. 2.....	.10 @
Red scrap, No. 1.....	.10 @ .11
No. 2.....	.08 @
Mixed black scrap, No. 1.....	.04 1/4 @
No. 2.....	.04 @
Rubber car springs.....	.04 1/2 @
Horse shoe pads.....	.04 3/4 @
Molding and packings.....	.01 @ .01 1/2
Garden hose.....	.01 1/2 @ .01 3/4
Auto brake hose.....	.05 1/2 @ .05 3/4
Cotton tire hose.....	.01 @
Large hose.....	.01 1/2 @
Hard rubber scrap, No. 1, bright fracture.....	.26 @
Battery jars (black compound).....	.02 1/2 @
Insulated wire stripping.....	.03 1/2 @
Rubber leels.....	.03 1/4 @

THE MARKET FOR CHEMICALS AND COMPOUNDING INGREDIENTS.

Copyright, 1917.

NEW YORK.

THE demand for rubber chemicals and ingredients during the past month has been exceedingly active. The dealers report unprecedented business in rubber materials, and the many inquiries received indicate that it will continue. Ocean rates are abnormally high. Only limited space is obtainable at \$40 to \$60 a ton, the rate normally being \$7.50 to \$10 a ton. The heavy export demand has reduced stocks of many ingredients, and resulted in advanced prices. Imports have been seriously affected, due to well-known shipping difficulties, and the recent British requisition of 85 per cent of the cargo space will further complicate trade with neutral Europe. There is every reason to believe a protective tariff will eventually be levied on all rubber chemicals imported into England.

CARBON GAS BLACK. The heavy export demand has exhausted all stocks in sight, and prices have advanced 5 cents a pound.

Producers have sold their output and the dealers control the spot market. Contract deliveries have been called for promptly.

CARBON TETRACHLORIDE. There has been active call for this solvent, and spot supplies have been heavily drawn on during the past month. Prices show a gain of 2 cents a pound.

CARBONATE OF MAGNESIA. The steady demand from European and domestic sources has developed a strong market, exports to France being particularly heavy. Producers are reported to be well sold up. Sales have been reported around 12 to 13 cents.

OXIDE OF IRON. The pure, bright grades have been scarce and business restricted, due to the continued heavy demand. Supplies have been limited, orders held up and the producers are unwilling to increase production to meet the requirements of abnormal conditions. Prices have advanced 3 cents a pound since our last report.

SHELLAC. A marked advance was noted early in the month, due to reports that exports from India will be prohibited. The market became easier, however, at the close of the month.

WHITING. The difficulties of securing the raw material have apparently increased. English cliffstone is almost impossible to obtain. The demand has continued to be active, and prices have advanced. The domestic producers are making every effort to meet the demand, but are unable to relieve the situation.

ZINC OXIDE. Contract deliveries have been insistently called for during the past month, indicating the strong position of this market. The speculation market on American process qualities has advanced 1 to 1½ cents, but there is only a limited supply offered at 11 to 11½ cents.

NEW YORK QUOTATIONS.

JANUARY 25, 1917.

Subject to change without notice.

Accelerene	lb.	Nominal
Acetone (drums)	lb.	\$0.22 @ 0.24
Acid, acetic, 28 per cent. (bbls.)	lb.	.04½ @ .05
cresylic (crude)	gal.	1.00 @
glacial, 99 per cent (carboys)	lb.	.30 @ .40
muriatic, 20 degrees	lb.	.01¾ @
nitric, 36 degrees	lb.	.05½ @
sulphuric, 66 degrees	lb.	.01½ @ .02
Alumina, To-six-o (carloads)	ton	19.00 @
Aluminum Flake (carloads)	ton	20.00 @ 22.00
Ammonium carbonate	lb.	.11½ @
Antimony, crimson, sulphuret of (casks)	lb.	.50 @ .65
crimson, "Magmetco"	lb.	Nominal
crimson, "Mephisto" (casks)	lb.	.50 @
golden, sulphuret of (casks)	lb.	.27 @ .35
golden, "Magmetco"	lb.	Nominal
golden, "Mephisto"	lb.	.29 @
golden, sulphuret, States brand, 16-17 per cent.	lb.	.28 @
red sulphuret, States brand	lb.	.23 @
Asbestine	ton	17.50 @ 20.00
Asbestos	ton	20.00 @ 40.00
Asphaltum "G" Brilliant	lb.	.02 @ .02½
Barium sulphate, precipitated	lb.	.04¾ @
Barytes, pure white	ton	30.00 @ 32.50
off color	ton	15.00 @ 20.00
Rasofor	ton	100.00 @
Benzol, pure	gal.	.60 @
Beta-Naphthol	lb.	1.00 @
Brown, sienna, raw powdered	lb.	.04 @ .06
umber, raw powdered	lb.	.03 @ .03½
Bone ash	lb.	Nominal
black	lb.	.04 @ .08
Cadmium tri-sulphate (f. o. b. London)	lb.	Nominal
sulphide, yellow	lb.	2.25 @
Canella gum	lb.	.33 @
Carbon, bisulphide (drums)	lb.	.05½ @
black (cases)	lb.	.20 @ .30
tetrachloride (drums)	lb.	.18 @ .20
Caustic soda, 76 per cent.	lb.	.04¾ @
Chalk, precipitated, extra light	lb.	.04½ @ .05½
precipitated, heavy	lb.	.03¾ @ .05
Chira clay, domestic	ton	16.00 @
imported	ton	60.00 @
Chrome, green	lb.	.37 @ .45
yellow	lb.	.4 @ .45
Cotton linters	lb.	.08 @
Exoherex	lb.	.85 @ .90
Fossil flour	lb.	.03½ @
Gas black	lb.	.20 @ .30
Gilsonite	ton	40.00 @
Glue, high grade	lb.	.40 @ .60
medium	lb.	.30 @ .40
low grade	lb.	.18 @ .30
Glycerine, C. P. (drums)	lb.	.5 @
Graphite, flake (400 pound bbl.)	lb.	.20 @
powdered (400 pound bbl.)	lb.	.07 @
Green oxide of chromium (casks)	lb.	.7 @
Ground glass (fine)	lb.	.02¼ @
Hexamethylene Tetramine	lb.	.65 @
Indian red, reduced grades	lb.	.04¾ @ .07½
pure	lb.	.07 @
Infusorial earth, powdered	ton	60.00 @
bolted	ton	65.0 @

Iron oxide, red, reduced grades	lb.	.6 @ .03½
red, pure, bright	lb.	.11 @ .13
Ivory, black	lb.	.10 @ .15
Lampblack	lb.	.12 @
Lead, red oxide of	lb.	.09¾ @
sublimed blue	lb.	.08¾ @
sublimed white	lb.	.08¾ @
white, basic carbonate	lb.	.08¾ @
white, heavy sulphate	lb.	.45 @
black hyposulphite (Black Hypo)	lb.	.45 @
Lime, flour	lb.	.01¼ @ .01½
Litharge	lb.	.11½ @ .12
English	lb.	.09¼ @
sublimed	lb.	.07 @
Lithopone, imported	lb.	Nominal
domestic	lb.	.11 @ .15
Beckton white (carloads)	lb.	.10½ @
Magnesia, carbonate	lb.	.12 @
calcined, heavy	lb.	.65 @
heavy, Thistle Brand	lb.	.35.00 @ 39.00
light	lb.	.05 @ .06½
Magnesite, calcined, powdered	ton	.01 @ .02
Mica, powdered	lb.	100.00 @
Mineral rubber	lb.	37.00 @
"M. R. N."	ton	57.50 @
"Genasco" (carloads)	ton	.03 @
"L. M. R."	ton	35.00 @
"Richmond Brand"	ton	.05 @
"No. 64 Brand"	ton	32.50 @
"Reinforced Material"	ton	.23 @ .25
"Rubrax"	ton	.27 @
Naphtha, stove gasoline (steel bbls.)	gal.	.27 @
66-68 degrees (steel bbls.)	gal.	.28 @
68-70 degrees (steel bbls.)	gal.	.21 @
V. M. & P. (steel bbls.)	gal.	.23 @
Oil, aniline	lb.	12.76 @
corn, refined (Argo)	cwt.	.93 @
linseed (bbl.)	gal.	.12 @ .12½
palm	gal.	.17 @
paraffin	gal.	.65 @
pine (cases)	gal.	1.00 @ 1.05
rapeseed	gal.	.675 @
rosin, heavy body	gal.	.21¼ @
tar (cases)	gal.	5.00 @ 15.00
soluble aniline colors, yellow, orange, red, violet, blue, green	lb.	.12 @
Orange mineral, domestic	lb.	10.54 @
Paragol (carloads)	cwt.	.06½ @
Petrolatum	lb.	.04¼ @
Petroleum grease	lb.	Nominal
Pine solvent	lb.	8.50 @
Pine tar	bbl.	.03¾ @ .04
Pitch, burgundy	lb.	4.50 @
coal tar	bbl.	7.35 @
pine tar	bbl.	1.50 @ 1.70
Plaster of paris	lb.	.80 @
Prussian blue	lb.	.03 @
Fumice stone, powdered (bbls.)	lb.	Nominal
Resin, Pontianak, refined	lb.	.20 @
granulated	lb.	Nominal
fused	ton	6.50 @ 8.50
Rosin (280 pound bbls.)	bbl.	.02½ @ .04
Rotten stone, powdered	lb.	.06 @
Rubber black	lb.	.08½ @ .12½
Rubber substitute, black	lb.	.13 @ .17
white	lb.	.12½ @ .17
brown	lb.	.35 @
Rubhide	lb.	.47 @ .50
Shellac, fine orange	lb.	35.00 @ 35.00
Silex (silica)	ton	22.50 @ 30.00
Soapstone, powdered	ton	.04 @ .04½
Starch, corn, powdered	lb.	.08 @ .09¾
Sulphur chloride (drums)	lb.	.220 @
Sulphur, flour, velvet, brand (carloads)	cwt.	.220 @
Bergenport, pure soft brand	cwt.	11.50 @ 15.00
Talc, American	ton	25.50 @ 30.00
French	ton	60.00 @
Toluol, pure	gal.	65.00 @
Tripolite earth, powdered	ton	.55 @
bolted	ton	.53 @
Turpentine, pure gum spirits	gal.	.11 @ .12
wood	gal.	.15 @ .50
Venice	gal.	.20 @ .25
Ultramarine blue	lb.	.95 @ 1.00
Vermilion, brilliant	lb.	1.30 @ 1.35
Chinese	lb.	.47 @ .60
English	lb.	.12 @ .20
Wax, beeswax, white	lb.	.35½ @ .55
ceresin, white	lb.	.60 @ .65
carnauba	lb.	.75 @ .80
ozokerite, black	lb.	.08 @
green	lb.	.08½ @
paraffin, refined 118/120 m. p. (cases)	lb.	.08½ @
123/125 m. p. (cases)	lb.	.09½ @
128/130 m. p. (cases)	lb.	.11 @
133/136 m. p. (cases)	lb.	Nominal
crude, white, 117/119 m. p. (bbls.)	lb.	.07 @
yellow, 124/126 m. p. (bbls.)	lb.	.75 @ .95
Whiting, Alba	ton	.120 @ 1.25
commercial	ton	Nominal
golden	ton	.07 @
Paris, white, American	cwt.	.07 @
English cliffstone	cwt.	.07 @
Wood pulp XXX (carload)	ton	1.50 @
Yellow ochre (Satin)	ton	.07 @
India roller	lb.	.07 @
Zinc oxide, American process, horsehead brand	lb.	.10½ @
"Special"	f. o. b. factory lb.	.10 @
"XX red"	f. o. b. factory lb.	.18½ @
French process, green seal	f. o. b. factory lb.	.17½ @
red seal	f. o. b. factory lb.	.18½ @
white seal	f. o. b. factory lb.	.25.00 @
Zinc sulphide, pure	lb.	.07 @



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Edited by HENRY C. PEARSON—Offices, No. 25 West 45th Street, NEW YORK.

Vol. LV. No. 6.

MARCH 1, 1917

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Published on the 1st of each month by

THE INDIA RUBBER PUBLISHING CO.

No. 25 West 45th Street, New York.

Telephone—Bryant 2576.

CABLE ADDRESS: IRWORLD, NEW YORK.

HENRY C. PEARSON, Editor

Vol. 55

MARCH 1, 1917

No. 6

SUBSCRIPTIONS: \$3.00 per year, \$1.75 for six months, postpaid, for the United States and dependencies and Mexico. To the Dominion of Canada and all other countries, \$3.50 (or equivalent funds) per year, postpaid.

ADVERTISING: Rates will be made known on application.

REMITTANCES: Should always be made by bank draft or Postoffice or Express money order on New York, payable to THE INDIA RUBBER PUBLISHING COMPANY. Remittances for foreign subscriptions should be sent by International Postal Order, payable as above.

DISCONTINUANCES: Yearly orders for subscriptions and advertising are regarded as permanent, and after the first twelve months they will be discontinued only at the request of the subscriber or advertiser. Bills are rendered promptly at the beginning of each period, and thereby our patrons have due notice of continuance.

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Entered at the New York postoffice as mail matter of the second class.

TABLE OF CONTENTS ON LAST PAGE OF READING.**RUBBER AND SUBMARINE WARFARE.**

THE declaration by Germany of a submarine blockade of the British Isles has become not only a serious menace to the commerce of the world but a matter of peculiar interest and concern to the American rubber industry.

As the financial and commercial center of the world, London has been generally regarded as the world's great rubber market, and will probably continue to be as long as the bulk of plantation rubber is grown on British soil, even though Germany should temporarily succeed in isolating the United Kingdom from the rest of the world. Since the outbreak of the war, however, New York has been rapidly measuring up to London as a commercial center. Its increasing importance as a rubber market is indicated by the fact that of our total 1916 rubber imports amounting to approximately 115,609 tons, or about 65 per cent of the world's production, not far from 70 per cent came through the port of New York. Only 25,647 tons, or a little over 22 per cent, came by way

of England, and the balance of approximately 89,962 tons, representing our direct rubber imports, were 20 per cent greater than the total rubber imports of the United Kingdom for 1916, amounting to about 75,240 tons. Therefore, the ordinary London stocks on hand, averaging about 10,000 tons, do not figure to any considerable extent in the American supply, and double normal and even greater cargo rates, together with recent increases in war risk insurance of 125 to 900 per cent, will tend still further to encourage direct rubber shipments to New York via the Panama Canal and to augment greatly the noticeably growing imports at Pacific Coast ports, through which nearly 30 per cent of our 1916 supply came.

While the submarine blockade is primarily one of British waters it has brought about a virtual tie-up of all transatlantic shipping of neutral nationality in American ports; and a long continuance of this situation cannot but result in a far reaching disturbance of the industrial life of the United States. Indeed, on February 15 it became necessary for 30 railroads to declare an embargo on export shipments through eastern ports until the vast accumulation awaiting sailings can be taken care of. From the standpoint of the rubber industry, therefore, exports are more seriously affected than imports, the situation in respect to raw materials being better than in certain other lines of manufacturing. There may be a temporary shortage in New York crude rubber stocks with consequent speculation and upward price fluctuations, but the dull January market indicated that most manufacturers have sufficient supplies on hand to tide them over this period. Our principal crude rubber supply routes still remain unaffected, but a considerable part of our exports of manufactured rubber goods, which amounted to nearly \$35,000,000 for the year 1916, are seriously menaced.

The policy of the United States in this commercial crisis has not been determined, and what England as mistress of the seas can do to alter the situation remains to be seen. At the time of writing the program to isolate her completely by submarine destruction of shipping at the rate of a million tons a month has fallen far short of fulfilment. Reported sinkings to date have not averaged half that. British officials express the belief that through the capture of undersea craft, convoy of merchant vessels and the establishment of strongly guarded ocean shipping lanes the British navy will have the submarine menace well in hand within two months and do not anticipate being obliged to resort to the cargo submarine in a struggle for existence. Unless the past rate is exceeded it will take approximately 3½ years to destroy the present British merchant marine totaling about 15,850,000 tons, and every British shipyard is running to full capacity day and night replacing lost tonnage. Since the outbreak of the war this has amounted to 4,000,000 tons, of which 3,000,000 tons is said to have been more or less adequately replaced.

SAVING AND RECOVERING SOLVENTS.

AT the close of the first instalment of his article on rubber solvents, elsewhere in this issue, Lothar E. Weber, Ph. D., touches upon the timely and pregnant subject of profitable solvent recovery, pointing out several of its advantages, difficulties and essentials. The prevailing high prices of gasoline and naphtha have stimulated interest to a remarkable degree of late in devices for both saving and recovery, and inquiries regarding processes and apparatus are of frequent occurrence.

The initial move in saving is at the storage plant, where tanks, pipes and faucets should be as tight as possible. Vessels used to carry the solvent should always have covers. More important, however, is that muddlers and mixers of all sorts should be closed when a batch is being put into solution. When finished it should be drained off into covered cans.

In ordinary spreading the solvent is evaporated as soon as possible, and lost. The beginning of solvent recovery is an exhaust hood hung over the spreader that collects the naphtha fumes. These are then easily condensed by chilling, and drawn off for further utilization.

Most of the solvent recovery mechanisms are either German or English in origin, and were designed for the great proofing establishments abroad. The Weber-Frankenburg, Vincent, Heinzerling and Spindle are the best known. While differing in many details, they do the work in much the same way. In a word, the fabric, as soon as it is proofed, enters a closed chamber, heat volatilizes the solvent, which is carried against cold surfaces, condensing it. Dripping from these surfaces, it is collected in tanks, often in water, drawn off and stored for re-use.

The whole apparatus is simple and one that any chemical engineer can construct without difficulty.

Of course, the idealist is just now to the fore with plans to do away with solvents in rubber work; to spread by heat only, and, carrying the thought further, to heat the tops of makeup tables, use hot rollers for rolling, hot stitchers for stitching, etc. But as far as extensive accomplishment goes that is all in the future.

THE HOUSING OF EMPLOYEES.

ONE of the greatest progressive industrial movements of the day is the comfortable housing of employes by their employers. The general prosperity of the country has made it possible, indeed imperative, because the refining influences of shorter working hours, better wages and superior education have brought about a higher standard of living which calls for expression chiefly in the home. It is a noble movement for any

great firm to identify itself with, and therefore a pleasure to state that the rubber and allied industries are well represented; also that the end is not yet.

But lest those who know little of it assume the enterprise to be purely philanthropic, its practical side should be emphasized. To live like a good citizen is to become one, and those firms who have made it possible for every operative to do so agree that benefiting the employe likewise benefits the employer. All report a better individual tone, an increased and improved mill production, a marked tendency toward permanency of employment, and a larger spirit of coöperation between the operative and the mill management.

These highly desirable results are achieved at virtually no ultimate expense to the firm, for it has been found that most men desire to own their homes and are willing to pay for them when an easy-payment plan within their means presents itself. A large firm erecting many cottages can build attractively and well for less money than the individual can build poorly. The financial standing, credit, expert advice and greater purchasing power of the employer insure minimum expense and afford the employe the opportunity to enjoy his house while paying for it. Meanwhile the firm gets legal interest on the investment and reaps many cumulative benefits besides. As contrasted with disorganized individual effort, building many houses along the lines of maximum standardization in design, adaptability to the application of the most economic methods of construction and coördination of the process of shop manufacture effect such further economies in cost as even to make possible permanent fireproof construction in certain localities.

In view of the manifest importance of this subject the series of articles setting forth what has already been accomplished by the rubber and allied industries, which begins on another page of this issue, is of timely interest in anticipation of further spring building operations. These articles are by John Barnard, a Boston architect who has studied the better housing of employes from its inception in England several years ago; who has visited Port Sunlight, Bourneville, Hampstead and other model British garden villages, and who has a thorough grasp of this industrial problem of the day and the means to solve it.

BRITISH RUBBER ASSOCIATIONS.

THAT the welfare of the British rubber trade will be closely guarded from now on and particularly after the war is suggested by the associations now in existence. They are The Rubber Growers' Association, Inc., The British Rubber Tyre Manufacturers' Association, Limited, The Rubber Trade Association of London, The British Rubber Shoe Manufacturers Association, The Balata Belt Manufacturers' Association, all of London; and The India Rubber Manufacturers' Association, Limited, of Manchester.

The Nature and Uses of Rubber Solvents—I.

By Lothar E. Weber, Ph.D.

[In the second installment of this article Dr. Weber will discuss benzol, solvent naphtha, shale oil, carbon bisulphide and carbon tetrachloride.]

IT is only in one or two specialized branches of the rubber industry that solvents play an integral part in the process of manufacture. On the other hand, the large majority of rubber articles require the services of a solvent in some part of their manufacture, or at least for some component part entering into their manufacture. The function of the solvent in the latter case may seem to be an unimportant one, but the manufacturer would be sorely pressed without its aid. The importance of the solvent is realized more vividly when for any one of a number of reasons it becomes a source of defective goods. It can be said that just as a chain is no stronger than its weakest link, so is a rubber article no stronger than its cement. Accordingly, the question of solvents is an important one for the rubber industry and the rubber manufacturer.

While the number of liquids which have the property of dissolving rubber is numerous, relatively few of them find commercial application in rubber manufacture. The origin of these latter it is proposed briefly to describe, as well as their use in the rubber industry, the specifications which they should meet, and the defects caused by failure to meet these specifications.

GASOLENE.

In this country the solvent which finds the most extensive application in the rubber industry is gasolene. This material is a product of crude petroleum, in which it is present to the extent of from 10 to 15 per cent, depending on the origin of the petroleum in question. By means of distillation crude petroleum can be separated into various "fractions," one of the most important of which is gasolene.

Unfortunately gasolene is not a homogeneous substance, but a complex mixture. Not only do the actual materials constituting it vary, but their relative amounts show wide fluctuations, while still permitting the product to be sold and bought as gasolene. These constituent substances are known chemically as hydrocarbons (that is, substances composed of carbon and hydrogen), and more specifically as paraffin hydrocarbons.

These constituting members of gasolene have a very close chemical relationship to each other. By way of analogy, they may be compared to a sectional bookcase, in that the latter is composed essentially of a base and one or more units. Just so these paraffin hydrocarbons are composed of their basic substance, added to which, is a varying number of units or increments. Naturally a hydrocarbon composed of the basic substance and, let us say 6 increments, differs in properties from a hydrocarbon composed of the basic substance and 7 increments. We can look upon gasolene as a mixture of hydrocarbons, each hydrocarbon being composed of the basic substance and a varying number of increments.

Since the components of gasolene may show such variation, some specific designation is necessary for the purpose of characterization. Unfortunately specific gravity has been chosen for this purpose, as in the early days of the petroleum industry it was soon recognized that the more volatile portions of the crude oil had a lower gravity, in fact that a relationship existed between volatility and gravity. It therefore became customary to sell gasolene on a gravity basis, the Baumé gravity scale being generally employed.* That this gravity designation has still survived is very much to be regretted.

(*According to the Baumé scale for liquids lighter than water, the reading increases with decreasing gravity. That is to say, 75-degree Baumé corresponds to a lighter gravity than does 60-degree Baumé.)

In the majority of cases it is the volatility of the gasolene which determines its desirability. In order, then, that the designation of the gasolene may be significant, there should be a direct relationship between the gravity and volatility. While this was to a large extent true in the early days of the petroleum industry, when crude oil had only relatively few sources of origin, it no longer holds true to-day. It is a matter of common observation that during recent years the volatility of gasolene has been continually decreasing with little or no change in the gravity. To be sure, in the case of motor gasolene there have been changes in both the volatility and gravity, but the 60-degree gasolene of to-day is much less volatile than the material sold under the same name three or four years ago.

The more accurate and significant method of designating gasolene is by reference to its boiling points. If gasolene were a homogeneous liquid composed of only one hydrocarbon, it would have a definite boiling point just as water has a definite boiling point of 212 degrees. As has already been pointed out, however, gasolene is not a homogeneous substance but consists of a mixture of closely related hydrocarbons. As these hydrocarbons boil at different temperatures, the mixture obviously cannot show a constant boiling point. It is for this reason that we find that whereas an average sample of gasolene begins to boil around 140 degrees F., a temperature of well over 300 degrees F. is necessary before all the gasolene will boil. There being a very close relationship between volatility and boiling point, by knowing the temperatures at which definite volumes of gasolene boil, one is in a position to compare accurately the volatility of one gasolene with another.

For the sake of clarity, there are tabulated below the boiling points of a few samples of gasolene taken at random:

	A	B	C	D
5 per cent boils under..	194 deg. F.	162 deg. F.	118 deg. F.	145 deg. F.
10 per cent boils under..	197 deg. F.	176 deg. F.	133 deg. F.	147 deg. F.
30 per cent boils under..	212 deg. F.	223 deg. F.	154 deg. F.	165 deg. F.
50 per cent boils under..	221 deg. F.	252 deg. F.	180 deg. F.	192 deg. F.
70 per cent boils under..	244 deg. F.	286 deg. F.	206 deg. F.	221 deg. F.
90 per cent boils under..	289 deg. F.	343 deg. F.	244 deg. F.	302 deg. F.
95 per cent boils under..	314 deg. F.	365 deg. F.	262 deg. F.	329 deg. F.
Specific Gravity	61 deg. Be.	60 deg. Be.	71 deg. Be.	72 deg. Be.

A represents a motor gasolene purchased in 1911.

B represents a motor gasolene of recent date.

C represents a 71-72-degree Baumé gasolene purchased in 1911.

D represents a 71-72-degree Baumé gasolene of recent date.

Comparing samples A and B, it will be observed that while the gravity of the two gasolenes is practically identical, there is a wide difference in their boiling points. Similar facts are observed on comparing samples C and D, which are of practically identical gravity. It is therefore evident that the designation of a gasolene by its gravity gives little indication as to its boiling points, and hence, as to its volatility. It would be much to the benefit of the rubber manufacturer if gasolenes could be bought or even offered on a boiling point basis. It would be sufficient merely to state the temperatures at which say 5, 50 and 95 per cent of the material boils in order to give the purchaser a general idea regarding its nature.

The three major uses of gasolene in the rubber industry are in (1) Spreading, (2) Dipped goods, (3) Cements. It may therefore be of interest to refer to the requirements which are demanded of the gasolene in each of these three applications.

SPREADING. For spreading purposes it is not desirable to have a gasolene showing extreme boiling points. That is to say, low initial points and high final points are undesirable. On the whole, sample A is a satisfactory gasolene for spreading, but

it would be preferable if 95 per cent of it boiled under 300 degrees F. rather than under 314 degrees F. Sample *B* is much less desirable, chiefly on account of the high final boiling point. The initial boiling point is a little lower than in the case of *A*, but scarcely sufficient to have it react to its disfavor. Sample *C* is considerably too low in boiling points for advantageous use in spreading. Sample *D* is much less desirable than sample *A*, for the reason that its extremes show wider fluctuations. For spreading purposes, it is undesirable to have the initial boiling points much under 160 degrees F., for the reason that if such is the case, large losses of gasolene are apt to take place while the rubber compound is being churned and also while the churned mass lies in the spreading room prior to use. The majority of the material boiling below 160 degrees F. is lost before the rubber dough reaches the spreading machine. An even more serious objection is the fact that these low boiling portions are not only non-solvents for rubber, but actually inhibit the dissolving action which the higher boiling portions exercise. The result is that these low boiling fractions, when present, actually tend to decrease the solvent power of gasolene.

On the other hand, if the gasolene contains an excessive amount of high boiling material, it is difficult to drive off the last traces on the spreading machine. The result is that the latter are retained by the coating and as a result of being subsequently vaporized by the higher heat of vulcanization become the most fruitful cause of what is known as "pin holes." To be sure, it is possible to overcome the danger of "pin holes" even when a gasolene is used containing much high boiling material, but not without seriously impairing the output of the spreading machine.

DIPPED GOODS. Since the evaporation of the gasolene used in dipped goods has to be accomplished without the aid of heat, comparatively high volatility is required. As in the case of spreading work, initial low boiling points are undesirable in that they inhibit the dissolving power of the gasolene and for the further reason, that they tend to produce blisters. If the nature of the gasolene is such that it evaporates too quickly, the outside surface of the cement dries, with the formation of a film, enclosing some gasolene underneath it. In the course of time this gasolene will tend to vaporize, and as the pressure of the latter becomes sufficient to rupture the outer "film," a blister results. On the other hand, if the boiling points are too high, blisters will also occur, as some gasolene will be retained. When the dipped articles are then subjected to the slightly elevated temperatures of the acid cure, the retained gasolene will be vaporized, again with the formation of blisters. A composite sample of *C* and *D* would be the most desirable; that is, a sample having the initial boiling points of *D* and the end boiling points of *C*.

CEMENTS. The gasolene requirements for a cement are essentially ease of volatility, and what is closely related thereto, complete vaporization of the solvent. Any residue greatly impairs the adhesive qualities of the cement and also its lasting qualities. Boiling points similar to those desirable for dipped goods will generally be found satisfactory.

The price of gasolene having steadily risen owing to the enormous increased demand, it is natural that attempts should be made for the purpose of obtaining substitutes for gasolene or at least of converting less valuable petroleum products into material having essentially the same properties. While it has not yet been possible to find such a substitute, two products are known which are used quite extensively in admixture with gasolene. The two materials in question are: (1) casing-head gasolene and (2) cracked gasolene.

CASING-HEAD GASOLENE. The source of this material is natural gas, from which it is obtained either by compression or else by so-called "washing" with oils of high boiling point. Casing-head gasolene is an exceedingly volatile material and for this reason comes on the market only in admixture with in-

ferior grades of gasolene. It is used primarily as a "sweetener," that is to say, for decreasing the boiling points of gasolene which would otherwise be unsatisfactory owing to excessively high boiling points. From the standpoint of the rubber manufacturer the addition of casing-head gasolene is undesirable, for the reason that the resulting mixed gasolene shows low initial boiling points and high end boiling points. As has been pointed out above, the rubber manufacturer is interested in a gasolene having relatively narrow extremes of boiling points. Even though the boiling points of the mixed casing-head gasolene show these variations, by suitable manipulation of the mixture the gravity is such as to give no indication of the presence of a mixture. This again shows the fallacy and undesirability, from the rubber manufacturer's standpoint, of estimating the value of gasolene purely on a gravity consideration.

CRACKED GASOLENE. The cracking of petroleum oils is a relatively old art, but it is only within recent years that special attention has been given to this process. Cracked gasolene is obtained usually from kerosene or fuel oil, and consists in subjecting either of the latter to high temperature and pressure. By means of the cracking process the high-boiling petroleum hydrocarbons are converted into hydrocarbons of much lower boiling points; so much so, that a large proportion of the material resulting from the cracking process boils within the limits of the average gasolene. However, a wide variety of substances are formed in this operation, some of which have markedly different properties than the paraffin hydrocarbons which constitute gasolene as we know it. Cracked gasolene is especially rich in a group of substances known as "olefines." These olefines are very undesirable from the standpoint of motor gasolene and are largely responsible for the so-called "carbon" deposits in the cylinders. This is one of the reasons why cracked gasolene comes on the market only in the form of an admixture with natural gasolene, and then only mixed in relatively small proportions. From the standpoint of the rubber manufacturer it is rather doubtful if these olefines are a detriment, except for the fact that their boiling points are relatively low. To be sure, if gasolene which contains much cracked material is allowed to lie in the tank for an extended period, the olefines have a tendency to go over into a thick viscous oil which settles at the bottom. However, in most rubber factories the gasolene does not have a chance to be stored sufficiently long, prior to use, to enable the formation of this heavy oil to take place.

SOLVENT RECOVERY. Many attempts have been made to recover or partially recover the gasolene used in certain branches of the rubber industry, notably in the spreading operation. The volume of gasolene in a spreading plant vaporized in the course of a month's operation reaches staggering figures and it is only natural that the recovery of the solvent should have been given serious thought. While theoretically the recovery of gasolene from the spreading operation is a simple matter, the practical difficulties and cost of equipment have so far stood in the way of its applicability. In this connection it is not generally recognized that even if all the gasolene which is vaporized in the spreading room were successfully condensed, the resulting material would have properties differing materially from those of the original gasolene. Owing to the relatively low initial boiling points of gasolene, considerable losses take place during the churning operation; so much so, that if only the gasolene which is vaporized in the spreading room were condensed, its boiling points would be very much higher than those of the original gasolene. The recovery process, in order to make it complete, would have to be extended to the churn room. It can readily be seen, therefore, that the size and cost of equipment of such a complete recovery plant would be high. Nevertheless, there is every reason to expect that a recovery plant would be a good investment if the purely mechanical and engineering difficulties are solved.



COTTON READY FOR SHIPMENT AT CALENICO, IMPERIAL VALLEY, CALIFORNIA.

Long-Staple American Cotton by Irrigation.

A MIRACLE is being performed in that part of the United States known as "the great Southwest," which promises soon to become the principal American source of long-staple cotton. Irrigation has provided the key to successful agriculture in Arizona, southern California and northern Mexico, where hundreds of thousands of acres of arid lands and great stretches of the Colorado Desert, on which only sagebrush, cactus and the pallid Spanish dagger formerly grew, are being transformed into one of the most bountifully productive regions of America. Grains, fruits, nuts, alfalfa, sugar cane, garden truck and live stock have in the past been looked upon as the chief products of irrigation, but the tremendous cotton yields of the past year indicate that this important crop may soon take precedence over all others. Weavers of higher-grade fabrics who are striving to meet the growing demands of rubber tire and other manufacturers are focusing their attention upon this remarkable development in the belief that an adequate supply of long-staple cotton grown within our borders will soon be assured. A few leading tire concerns are manifesting even more direct interest, one having contracted with a planter in Imperial Valley, California, to take annually for five years the entire crop from 5,000 acres of new land, and the other being about to plant 1,000 acres of cotton in Salt River Valley, Arizona, to insure its supply of tire fabric.

Although the United States provides considerably more than half the world's cotton production (57.4 per cent in 1915) and exports a tremendous quantity annually (6,191,110 bales for the year ending July 31, 1916, or more than half the year's ginnings) it does not grow an adequate supply of long-staple cotton to meet the American demand for thread, knit goods, lace, tire and other higher-grade fabrics requiring great strength. Of the 420,995 bales of foreign cotton imported during the fiscal year 1916, statistics show that 350,796 were long-staple Egyptian. At least half of this was used in the manufacture of tire fabrics, for it should be noticed that considerably less than 1 per cent of the total 1915 American cotton crop of 11,191,820 bales was of the Sea Island variety. With slight prospect of any considerable increase in this percentage it is not surprising that the phenomenal growth of the cotton planting industry in California since 1909 should set tire manufacturers and fabric weavers to thinking.

Tires average about 5 pounds of fabric each, and as it is estimated that the 1917 tire production will reach 25,000,000, about 125,000,000 pounds of fabric, equivalent to, over 250,000 bales of long-staple cotton, will be required to meet this demand alone. 350,000 acres planted to Durango or Egyptian cotton in the Southwest and scientifically cultivated would render the American tire industry independent of imports, and this is only a little over one-third of the unimproved land in Imperial Valley alone that can be irrigated by the available water supply, which can be even further increased by the building of reservoirs.

The outstanding fact which has awakened the tire industry to its great opportunity is the 1916 crop of Imperial Valley cotton, grown entirely by irrigation and amounting to 70,000

bales—equivalent to 76 per cent of the 1915 Sea Island total of 91,844 bales, 5,824 of which were exported. Not all of this was long-staple, though it might have been, for the Durango variety thrives there and is said by experts to be equal in quality to the choicest Sea Island and better than much of the Egyptian cotton now offered to the trade.

From approximately 100,000 acres on both sides of the international boundary, about 45,000 acres in the United States and 55,000 in Mexico, the 1916 crop reached the record total of 40,000 short-staple bales of big boll mebane, averaging 18 cents a pound, and 30,000 long-staple Durango bales averaging 24 cents. Some of the former brought as high as 19 cents, and of the latter as high as 28 cents, so that the value of the total cotton yield of Imperial Valley is estimated at \$7,500,000 to \$8,000,000, making this the premier crop of what is becoming the richest agricultural community in California.

As it costs an average of 9 cents per pound to produce short-staple cotton and 12 cents to grow, pick, haul and gin the long-staple, the planter who sold at 18 cents and 24 cents respectively, as many did, doubled his investment at the rate of \$45 and \$60 per bale, to which may be added \$15 to \$20 per bale for the seed. This profit of \$60 to \$80 per bale, the prospect of growing a bale or better per acre, together with an ever-growing demand at record prices are the inducements that will probably double the cotton acreage of Imperial Valley in 1917.

Despite the prospect of enormous cotton acreages throughout the South next year, 95 per cent of this will be short-staple so that record crops will not depress the high prices obtainable for the California product, because the demand for long-staple will still be in excess of the probable supply. Buyers who are trying to contract forward for Imperial Valley short-staple cotton at 17 cents and long-staple at 23 cents are finding few takers, for the planters realize that the present surplus on hand is smaller than at any time within the past decade, and that with increased consumption and a short crop in other growing countries, the end of the war, should it occur, would immediately open up greater markets abroad. Should the war continue, they also know that American munition manufacturers consumed 900,000 bales during the year 1916, exclusive of heavy exports to Canadian, British and French factories.

With the entire question of cotton as one of the permanent and most important farm industries of southern California apparently settled for good and all, Los Angeles, as a great cotton market of the near future, promises to take its place beside the great cotton ports of the South, and to outstrip Savannah, Brunswick, Pensacola and Charleston as a shipping point for long-staple cotton. Its railway connections and fine harbor provide the shipping facilities to send cotton textiles all over the country, the western hemisphere and even around the world, and already local capitalists of vision are beginning to discuss a project to erect large yarn and weaving mills. A growing conviction is being manifested that cotton goods and by-products for consumption west of the Rocky Mountains should be manufactured in California.

It is well to mention the matter of by-products, for time was when the old-fashioned planter had to burn the seed and stalks to get rid of them. Now, through the ingenuity of man and his modern machinery there is no waste whatever, and cottonseed products are numerous, varied and valuable. Linters, oil, cake and hulls all have their uses. Even cotton stalks are employed in the manufacture of fiber, paper, carpets and vegetable ivory or cellulose.

From the long-staple cotton going to make up a bale, about 1,200 pounds of seed are extracted, and from short staple the yield is only a little less, so that Imperial Valley ranchmen last year received in the neighborhood of \$1,250,000 for seed alone. At the beginning of the cotton season in September the three oil mills in the valley began paying \$20 a ton for cottonseed, but because of improved shipping facilities raised the price to \$30, and toward the close of the year to \$40.

Of the immediate products of expressing the oil from the seed, the linters are used for absorbent cotton and in the manufacture of high explosives. The oil makes excellent soap, is widely used in cooking as a substitute for lard, and when refined often replaces olive oil for the making of salads. The hulls are in demand for feed and the cake for both feed and fertilizer. Cotton hulls make an excellent fattening food for cattle, while cottonseed meal, obtained by grinding the cake, is not only fattening but when fed to sheep is said to produce 15 to 20 per cent more than the normal growth of wool. The five states of Utah, Montana, Oregon, Idaho and Washington will consume all the cottonseed meal and hulls the Imperial Valley can produce for years to come, thus in a sense turning cotton into wool. For winter feeding the cake is made into balls about the size of an English walnut for scattering over the snow.

Thus this great new agricultural industry is becoming of keen interest to labor as well as capital. Already it has provided an exceptional opportunity for unskilled workers. Shortage of cotton pickers at the beginning of the season threatened disaster, but the County Farm Bureau soon had the problem well in hand with laborers coming from all parts of southern California, Texas and Oklahoma. The fact that the plants would not rust nor mildew on account of the absence of rain and fog made it possible to extend the picking season considerably and so helped mightily in solving the labor problem. Los Angeles bootblacks and even women have been making the wages of building mechanics in the cotton fields. The rate paid ranged from \$1.00 to \$1.25 and even \$1.50 per 100 pounds, depending on the stand, and ginning averaged \$4.50 per bale.

The raising of cotton in this the largest irrigated cotton area in the United States has many advantages. Government crop reports show that the yield is high and that the staple has length, strength and uniformity; characteristics which are very desirable, and due, in part, to the absence of periods of drought or of excessive rains. Government statistics also show that the average yield per acre in Imperial Valley was 400 to 500 pounds, or approximately one bale, whereas the average in the entire country was only 170 pounds. The reasons for this greater yield

are the warm climate, rich silt soil, the ability to apply water whenever needed, freedom from pests and longer growing season.

Because of this latter fact, instead of one crop, Imperial Valley cotton plants produce two, or more correctly, a series of crops. Cotton takes very little from the soil, and a simple system of occasional crop rotation or fertilizing enables one to carry on a plantation indefinitely. As Department of Agriculture officials credit Imperial Valley with the highest priced short-staple cotton, averaging 16 to 18 cents against 11.3 cents for the entire country, it is not surprising that tracts are known to have paid the full cost of the land plus the cost of irrigating, planting, cultivating, picking and marketing in one season and still netted a profit of \$25 an acre.

On many well-worn plantations in Georgia and Alabama pickers consider themselves doing well to get half a bale of short-fiber cotton to the acre a season, while several tracts under irrigation in the Imperial Valley are on record as having produced two bales of long-staple cotton to the acre and two crops a year which has brought as high as 28 cents a pound, and this on land that cost less than \$100 an acre, water rights included.

Cotton has been grown in this locality on a commercial basis for only a few years. There were 5,986 equivalent 500-pound bales ginned in 1910, 9,790 in 1911, 8,215 in 1912, 22,838 in 1913, 49,835 in 1914, and 28,551 in 1915. According to the estimates of the Department of Agriculture, the cotton area in



COTTON FIELD IN THE IMPERIAL VALLEY.

1916 was 98,000 acres, or about double the average in cultivation the previous year.

The statistics above include cotton grown in Mexico (Lower California) and brought into this country to be ginned. The same conditions of soil and climate are found in the Mexican portion of Imperial Valley as in the American, while the cost of cultivating and picking is less because of the availability of Chinese labor. According to official reports, the quantity of unginned cotton imported into the customs district of southern California from Mexico during the year ending July 31, 1915, produced about 21,000 bales of lint.

Some fields below the boundary line yield enormously, several growers obtaining a bale and a half to two bales to the acre. One grower who leased 1,600 acres at \$10 an acre raised 2,000 bales of fine quality short-staple cotton and sold it for \$160,000. His profits in a single season were about \$75,000. From the same field a cotton stalk was cut in October that had more than 300 fully matured bolls. Rules for estimating yields are that 65 matured short-staple bolls will make a pound of cotton, and that land when planted in rows three and a half feet apart and the plants two feet apart will yield one bale to the acre if the plants average forty bolls. An acre of plants such as was cut from this Lower California field would produce more than 7 bales.

The development of Imperial Valley, due to irrigation, has been phenomenal. Fifteen years ago the census could have been taken on the fingers of one hand. To-day it has increased to over 50,000 and the thriving towns of Calexico, El Centro, Im-

perial, Brawley, Holtville, Seeley, and Calipatria take a just pride in their fine churches, schools, libraries and community institutions. About 500,000 acres are in cultivation—approximately 100,000 acres each in cotton, alfalfa, and barley, besides immense tracts devoted to fruits and vegetables and the raising of over 200,000 head of cattle, sheep, horses, mules and hogs—and the yearly agricultural production considerably exceeds \$25,000,000. Land values vary from \$65 to \$150 an acre according to proximity to towns and the assessed property valuation is not far from \$90,000,000, yet the county tax rate steadily decreased to \$1.90 in 1914.

According to a recent report of the chief engineer of the Imperial Irrigation District, 1,400,000 acres may be irrigated from the Colorado River. Of this vast area, 700,000 acres are in Imperial Valley proper, 500,000 acres in the delta of the Colorado and 200,000 acres in Sonora, Mexico, below the Yuma Valley. Thus no less than 900,000 acres of irrigable land still remain undeveloped—an area that would render the nation independent of long-staple cotton imports for many years to come.

Without the need of a dam, the water for the Imperial Valley irrigation system is diverted from the Colorado River through a concrete head gate about 12 miles below Yuma, Arizona, and 4 miles above the Mexican line. The main canal carries the water through the natural channel of the Alamo River to headings whence distributing canals divert it again to the various farms. The main channel was originally owned by the California Development Co., but during the past year the people of Imperial Valley organized the Imperial Irrigation District and bonded it for \$3,500,000 to purchase the irrigation system. As present canal facilities embrace about 574,000 acres, the bonded debt is only about \$6.10 per acre. The average cost of irrigation water throughout the valley is about \$3.50 per acre a year, varying somewhat with the character of the soil and the nature of the crop.

Most of the cotton grown in the Salt River Valley, of Arizona, has the same characteristics as the cotton grown in Egypt, having been propagated from seed brought from that country. It is grown on irrigated land and the average yield is high, especially where the soil has been improved by alfalfa and beneficial river sediments. Arizona's production for the past four years has been 2,229 bales in 1913, 7,142 bales in 1914, 1,981 bales in 1915 and about 4,000 bales in 1916. The falling off in 1915 was due to smaller planted acreage on account of low cotton prices at that time. But with approximately 7,000 acres planted in 1916 and both demand and prices promising for some time to come, the permanent establishment of the Egyptian cotton industry in that state seems assured.

Including the Roosevelt Dam, the government has expended over \$10,000,000 on the Salt River project for the benefit of the people in the intensive cultivation of 219,000 acres of land where climate, soil and water are virtually ideal. The present cost of water for three acre feet, the usual amount required, is only \$1.50 a year, and it is expected that within a few years it will be delivered practically free because of the sale of surplus water outside the project area. There will also be a revenue of \$1,000,000 from 27,000 electric horse power, 10,000 of which, yielding \$400,000 annually, is already being consumed by mining concerns.

There are no government lands in the Salt River Valley. Every acre is in private hands and the acreage of rentable lands obtainable on lease is comparatively small, but land prices are still reasonable and terms of payment convenient. As the area of the project is limited, however, title to every irrigable acre promises to be steadily on the increase. Improved land that is being farmed costs \$100 to \$200 per acre, while lands for cotton are still obtainable at \$100 to \$125 per acre. Yields per acre have not equaled Imperial Valley, but they are far above the average and with scientific cultivation should reach a bale per acre.

LONG-STAPLE COTTON IN 1915-16.

IN addition to the wealth of statistics and other information characteristic of previous reports of this nature, Bulletin 134, recently issued by the Department of Commerce, Bureau of the Census, entitled "Cotton Production and Distribution, Season of 1915-16," contains considerable information of interest to manufacturers of automobile tire fabrics. Several quotations selected from various sections of the bulletin have been pieced into the following continuous narrative:

The limited supply of cotton having a long staple, and the world-wide demand for cotton of this character in the manufacture of thread and the higher grade fabrics, and recently of automobile tires, have given such varieties an importance seemingly out of proportion to the amount produced. While at one time long-fiber Sea Island cotton grown in the West Indies provided a large part of the total used in Europe, the world's production of this variety at the present time is comparatively insignificant, averaging less than 100,000 bales per annum. The quantity of long-fiber cotton produced in Egypt last year was less than a million bales, and the quantity of upland cotton with a staple of $1\frac{1}{8}$ inches or more in length produced in the United States from the crop of 1915, according to the estimate of the Department of Agriculture was about 825,000 bales. Long staple cotton is also produced in comparatively small quantities in India, Brazil, Peru, and several other countries. Altogether the total of long staple cotton—that is, cotton having a fiber of $1\frac{1}{8}$ inches or more in length—produced throughout the world from the crop of 1915 did not, in all probability, exceed 2,000,000 bales.

The 1915 crop of Sea Island cotton is given as 91,844 running bales divided as follows: Georgia, 57,572; Florida, 28,094; South Carolina, 6,178. Of this total 5,824 bales were exported. The 1916 exports, however, were only 3,580 bales.

It might be presumed that the prices generally received for Sea Island cotton would cause a large increase in the acreage, but attempts to grow it in other parts of Georgia, Florida, South Carolina and other states have been so unsatisfactory that practically all efforts to raise it outside of certain well-defined areas in the states named above have been abandoned.

Of the total consumption of cotton in the United States during the year ending July 31, 1916, amounting to 6,397,613 running bales, 82,645 were Sea Island and 316,995 foreign. A very large proportion of the foreign cotton consumed was Egyptian; imports of Egyptian cotton by American manufacturers have led to efforts to grow in the United States cotton having its characteristics, and some encouragement has been given the movement by the success attending its culture in Arizona.

The status of the cultivation of Egyptian varieties of cotton in this country is presented in the following statement, prepared by the Department of Agriculture:

The abnormally low prices of 1914 caused a greatly diminished acreage to be planted to Egyptian cotton in Arizona in 1915. The total production last year amounted to only about 1,100 bales of 500 pounds each. This small crop sold at a much better price than in 1914, and consequently the acreage planted in 1916 increased to about 7,000 acres. A crop of about 4,000 bales is anticipated this year. The improvement in methods of production which is taking place as the farmers of Salt River Valley become better acquainted with this crop will probably result in larger average yields per acre than have previously been obtained. * * * In view of the strong demand for the type of cotton (Sakellarides) with which the Arizona product is most nearly in competition, the prospects for the permanent establishment of the Egyptian cotton industry in that state are better than ever.

EMBARGO ON YARNS FROM SEA ISLAND COTTON

On February 23 the British Cotton Export Committee issued a notification to the Manchester Chamber of Commerce announcing that it will not in the future recommend the issue of licenses for the export of cotton yarns made from Sea Island cotton.

The Manufacture of Klingerit Steam Packing.

The extremely high temperatures created a demand for packing of special composition that would withstand the extremely high temperature and unusual steam pressures resulting from this radical change in steam engineering. The ordinary rubber sheet packing was characteristically unfitted to resist steam pressures of 180 pounds and temperatures varying from 180 to 185 degrees C. A reliable heat resisting steam packing was therefore a prime necessity and German ingenuity promptly attacked the problem of evolving a new packing material. A composition consisting of asbestos, rubber and certain

mineral fillers, such as china clay, barytes, infusorial earth and hydro-cellulose was found to be very satisfactory. The rubber content, however, was comparatively small, as its province in this instance is principally that of a cement.

The first compressed asbestos sheet packing offered to the trade was manufactured by R.

Klinger at Gumpoldskirchen near Vienna, Austria, and known as "Klingerit." This new material was successful almost from the start and the large demand that soon

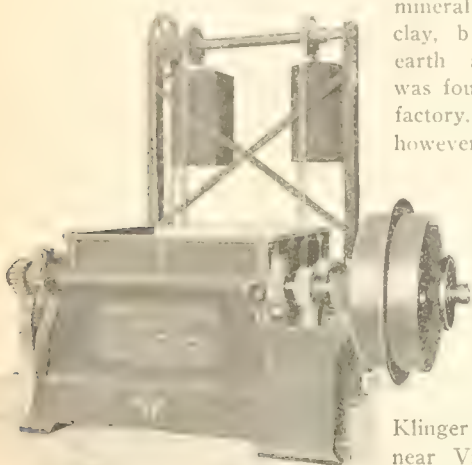


FIG. 1. -WERNER & PFLEIDERER'S MIXER.

followed grew in volume until it became worldwide. It was not long before aggressive competition appeared and similar compositions were manufactured and sold under the trade names, Moorit, Mezelerit, and Cooperit. The name "Itplatte" was subsequently protected by Gustav Adolph, of Biebrich, Wiesbaden, Germany.

The United States' trade in asbestos sheet packing that rapidly grew to large proportions was for the greater part monopolized by the German manufacturers who were able to undersell their competitors in this country. Since the war has effectively closed this source of supply the demand has been supplied by American manufacturers, and the following brief description of machines used in the manufacture of Klingerit will therefore be of interest.

The crude asbestos is first treated in a machine of the type known as a Chili mill, which separates the impurities and felts the fibers together. The asbestos material is then passed through a carding machine provided with a belt conveyor that carries away the carded fiber in the form of a light fluff. The preparation of the rubber is in no way different from that of making ordinary cement, the washed and dried rubber being placed in a power driven churn and sufficient benzene or naphtha added to make a thin solution. The compounding ingredients consisting of heavy calcined magnesia, oxide of iron and sulphur are then added to the rubber solution and the whole is thoroughly mixed

for about 2 hours in a Werner and Pfeleiderer enclosed mixer shown in Figure 1. Finally the carded asbestos fiber is slowly fed into the same machine and worked up with the other materials into a homogeneous mass.

The sheets are then built up on the Hauboldt mill shown in Figure 2. This machine is designed on the principle that a comparatively small roll operating against one of large diameter, and both revolving at equal surface speed, will exert a greater pressure on the material than two rolls of the same diameter.

This machine has very heavy frames *A* and *B* supporting the rolls *C* and *D*, that are operated by double faced spur gears *E* and *F*, the circumference of the large roller determining the length of the sheet. The small roll *C* is adjustable and driven from the main driving shaft by the large spur gear *G*. The counterweights *H*, *H* hold a stripping knife against the surface of the small roll to keep it smooth and clean. The large roll *D* is hollow and provided with steam and water connections for heating and cooling purposes, while movable gages determine the width of the sheet.

In operation, the small pressure roll is adjusted to the desired thickness of the sheet and the warm dough is evenly applied to the large roll in convenient sized balls or chunks in a manner similar to that used in calendering. A very thin sheet is thus formed on the large roll in the form of a jacket which after being rolled down to size is coated with a special rubber solution containing the distinctive coloring matter. Dough is again applied to the large roll and the second sheet rolled down on the first one and solutioned. This operation is repeated until the desired thickness has been attained, when the built-up sheet is cut transversely and removed from the roll.

Sheets up to 6½ feet wide, 9½ feet long and about ¼ inch thick may be made on this machine.

The solvent recovery apparatus shown in Figure 3, consists of a water-cooled casing surrounding the rolls and provided with an opening of sufficient size to permit material being fed to the

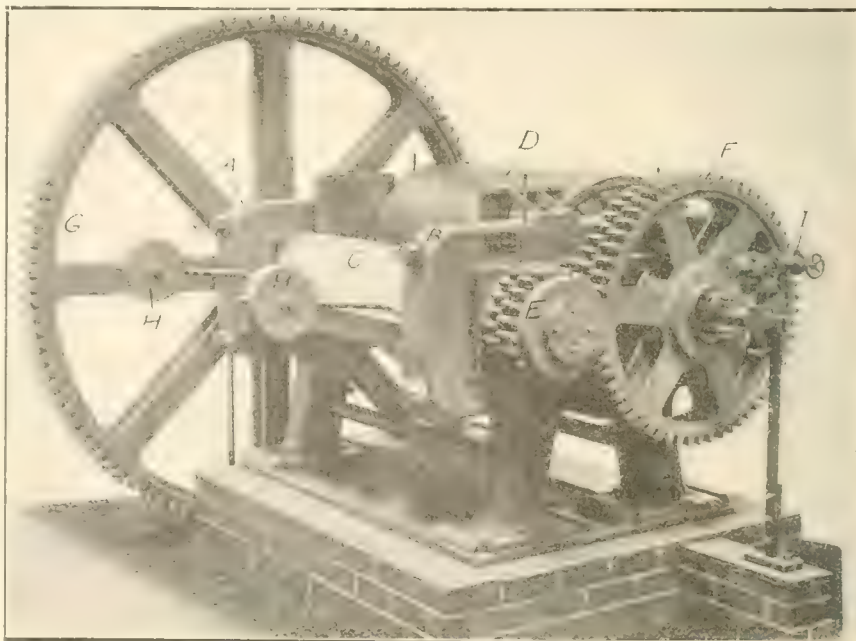


FIG. 2. HAUBOLDT'S ITPLATE MILL.

machine. A spray of water from pipes located inside of the casing creates a downward circulation of air and naphtha vapor

which is condensed and flows on the water through the connecting pipe to a receptacle on the right where the condensed solvent is separated and drawn off.

The finishing operation of standard sheets consists in applying a cover coating of a colored rubber solution to both sides of the sheets and passing them between the rolls of a two-roll

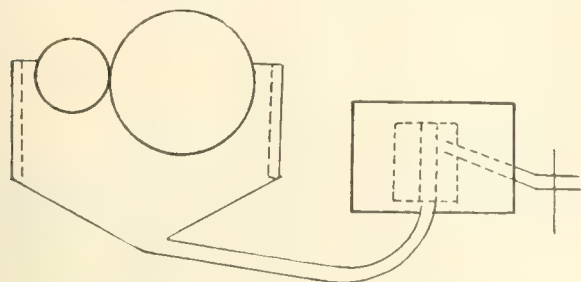


FIG. 3.—SOLVENT RECOVERY APPARATUS.

vertical calender. Klingerit boards of different gage are made on the same machine by doubling sheets of predetermined thickness.

It frequently occurs that the sheets made on the rolling machine or calender are spotted with dark stains or imperfectly laminated. The machine shown in Figure 4 was therefore designed and found very satisfactory in turning out perfectly finished boards.

It comprises two solid side frames supporting between them a heavy bed-plate or table on which the sheets are placed. A heavy polished, chilled iron roller is journaled in a movable carriage that traverses the table in both directions, driven by a reversible lead screw, the movement of which is controlled by straight and crossed belt-driven pulleys. A sheet is placed on the table and the weighted roller is passed back and forward over the surface several times. It is then turned in a horizontal plane and the rolling continued, after which the sheet is reversed and the other side treated in the same manner.

Standard Klingerit boards are 3.75 millimeters (about $\frac{1}{8}$ inch) in thickness, being built up with 15 thin layers that are .25 millimeters thick. They are blue, reddish-brown, or green in color and the dimensions are as follows:

Millimeters.	Equivalent Inches.
2000 x 2000	78.7 x 78.7
2500 x 2500	98.4 x 98.4
2000 x 3000	78.7 x 118
3000 x 3000	118 x 118
1250 x 4000	49.2 x 157.4
1600 x 6200	62.9 x 244

"It" material is made only in unvulcanized sheets from which the various shaped packings are cut or stamped, the contained rubber being vulcanized after the joint has been made by the heat of the steam. For special purposes metal gauze or tin-foil is placed between the sheets or they may be coated with graphite, the object being to prevent vulcanization. Attention is particu-

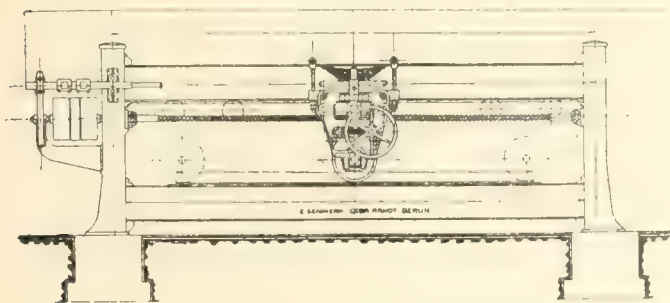


FIG. 4.—ARNDT'S SHEET ROLLING MACHINE.

larly called to the fact that Klingerit packings should be kept in a cool dry place, otherwise they will become hard and lose their flexibility.

NEW USES OF SPONGE RUBBER.

BECAUSE of its cellular structure, sponge rubber has several very peculiar properties. For example, it has the lowest apparent specific gravity of all solid bodies, being around 0.05. In spite of its cellular structure it is water-tight, and very nearly gas-tight. While it is honeycombed with minute cells, each cell is an individual unit and the rate of diffusion of gases through it is comparatively low. Because of its low specific gravity it has a very low specific volume, which thus brings its cost within range for common purposes. Perhaps one of the most important uses to which it has been put is in the preparation of life preservers. It will not waterlog, is light, conforms easily to the lines of the body, and is not to be ruined by a pin prick. A life raft made with sponge rubber is as near fool-proof as one can be. Buoys, markers, etc., may be improved by its use.

For some time the brains and time of many men have been occupied in a search for a substitute or modification of the pneumatic tire for automobiles. We have seen about everything, from metal springs to tires made with the regular tire casing but containing a solid block of gum used as a bumper. The season of tire fillers occupies now only a page in the history of this search. Springs have been discarded because of their slowness to respond, and it has been decided by the great majority of automobile owners that nothing rides as easy as air, and rather than use tire fillers they would substitute solid tires.

Two serious objections to most tire fillers are that under constant running they tend to heat up, and finally to decompose, and, second, there is quite a tendency to form flat spots.

As has been mentioned, the most satisfactory tire filler to date is air. This air is customarily held in an inner tube under moderate pressure. It is now proposed to use sponge rubber molded to fit the inside of the tire casing, and in this manner produce a puncture-proof tire. The car still rides on air, but this air is confined in innumerable little sacks. The conditions necessary for a satisfactory tire filler are as follows:

1. It must be quite stable and so constructed that fatigue is reduced to a minimum.
2. It must be light.
3. The driving power must be transmitted elastically.

Sponge rubber fulfills all these conditions. Tires filled with this material were driven 1,950 miles, with an average speed of 35 miles per hour, without any deterioration of the filler.

As would be expected, the cellular nature of sponge gives it great insulating properties, both in respect to heat and sound. It is proposed to use the material for the construction of sound-proof rooms, telephone booths, under musical instruments, and under vibrating and hammering machines, etc. It is proposed also for clothing for aeronauts and arctic explorers.

So far we have spoken only of soft sponge rubber. Hard sponge rubber is also available. It is prepared from soft sponge by further vulcanization. It is understood that the soft sponge is secured by properly regulating the time and temperature of the cure. The stock is made up with sufficient sulphur to effect the transformation to ebonite, so that after producing soft rubber further vulcanization takes it over to hard sponge.

This material has an apparent specific gravity of 0.2 to 0.065, which is $\frac{1}{2}$ to $\frac{1}{6}$ that of cork, and $\frac{1}{4}$ to $\frac{1}{12}$ that of wood. It may be worked in any way customary with hard rubber, such as sawing, boring, machining, etc. It still has the cellular structure of soft sponge, and therefore its insulating properties are not in the least affected. However, it is now not so susceptible to temperature change, and will stand temperatures up to 130 degrees C. It is recommended for icebox walls, covering for flasks, and other insulation problems.

Hard sponge has considerable strength, and has been proposed as a material for the framework of aeroplanes. It has also been recommended as a material for constructing automobile bodies. [Andrew H. King in "Metallurgical and Chemical Engineering."]

TIRE FILLERS AND PUNCTURE FLUIDS.

THE use of tire fillers is not generally encouraged by rubber manufacturers. They contend that a tire casing filled with a substance possessing a "rubber-like resiliency" is virtually a solid tire and would better be made wholly of rubber.

Puncture fluids are also discouraged as being an evasion of the well-known fact that the most effective medium for repairing rubber is rubber itself. Moreover, the reclaiming of tires containing puncture fluids is troublesome and expensive.

The European war, however, has created unusual conditions that demand continuous and exceedingly severe tire service until both casings and tubes are entirely worn out. At the front both the Allies and the Central Powers are using tire fillers through obvious necessity rather than choice. For this reason the following brief review of the representative types of fillers and puncture fluids is timely.

Tire fillers are of three kinds. The first is a liquid to be injected into the tire, where it subsequently solidifies, forming a cushion substitute for air. The second consists of porous rubber compound molded in sections conforming in size and shape to the casing in which it is to be inserted. The third is a viscous puncture fluid that flows over and coats the inner surface of the tube.

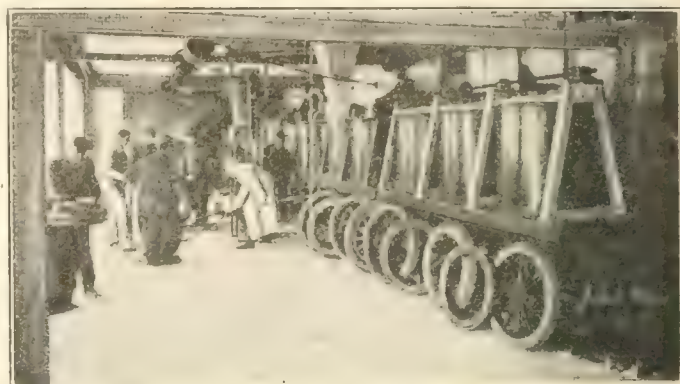
A tire filler of the first type consists of a heavy fluid which is either forced directly into the casing or pumped into the inner tube through the valve, where it soon solidifies into a resilient, rubber-like body. "Rubberine" belongs to this first class and is a semi-fluid filler, to be pumped directly into the casing, which it distends to the required pressure according to the weight of the car and then solidifies into an elastic body. Inner tubes are thus dispensed with and the tire requires no more attention until thin or completely worn out. This is an English preparation which is being used with considerable success in military service where the ordinary tire has proved undependable under extreme road stress and gun fire.

"Newmastic" is of American origin and representative of that class of fillers which are pumped into and completely fill the inner tube at the proper operating pressure. With this filler the casings should be new, but old inner tubes may be used. Should

in the casing in sections, end to end, after which the tire is applied to the rims of the wheel by means of a special tool provided for the purpose.

Zuber's patent solid filler consists of molded blocks of sponge rubber, the ends of which overlap when fitted within the casing. Closed air chambers in each block provide additional resiliency.

The third class, puncture fluids, is of value chiefly for bicycle and motorcycle tires. It embraces those mucilaginous preparations, rarely compounded of rubber, which hold in suspension solids or fibers, such as whiting, graphite or asbestos, and which



"RUBBERINE" TIRE FILLING PLANT.

harden instantly upon exposure to air. Enough of the liquid is pumped into the tube under pressure to coat its inner surface with a thin layer occupying only about five per cent of its volume. This viscous compound is evenly distributed by rotation of the wheel, and in case of a puncture is at once forced into the hole by air pressure, where the minute obstructions in suspension form a clot and facilitate immediate hardening of the compound into a permanent plug. "Bale's Puncture Plugger," "Neverleak" and "Tire Treat" are among the well-known fillers of this class.

While puncture fluids take care of ordinary tack and nail holes, large cuts and blow-outs still require patching and vulcanizing, which are less easily accomplished after employing some of the preparations on the market. "Cyco," however, is said to be made of vegetable gums which do not interfere with vulcanizing and which preserve the rubber. The same is claimed for the "Glines' Liquid Rubber."

"Permanit," an imported preparation, occupies a unique position in this class. It comes in the form of a powder, eight ounces of which is pumped into each tube. One and one-half ounces of water is then injected and the wheel rotated slowly 10 to 20 times, in order to distribute the powder thoroughly. "Permanit" is neither soluble in water nor does it become a paste, glue or fluid, but when a puncture occurs and the powder comes in contact with the outer air a chemical reaction takes place whereby the injured part is instantly healed. One treatment will last at least a year, and a tube can be vulcanized with the powder in it should a blow-out make that necessary.

RUBBER BELTING AND OTHER SUBSTITUTES FOR SOLE LEATHER.

Owing to the high cost of leather, English manufacturers are using substitutes for both uppers and soles of the shoes, some of which are furnished to the troops. Linen duck coated with a mixture of wood tar, pitch, turpentine oil, cork powder and rubber cement are joined together in several thicknesses, compressed between powerful rollers and then cut into soles. The material can be easily sewn and pegged, and seems to serve its purpose admirably.

This is not a new idea. Some shoe finders in this country have for years been purchasing scrap rubber belting and cutting it into half soles to sell to shoe repairers, who find that such soles wear admirably, especially in mining districts.



"NEWMASTIC" TIRE FILLING PLANT.

the casing stretch excessively under severe usage it may be hardened by pumping a small quantity of the liquid into the tire.

To the second class of tire fillers belong those which are first molded from sponge rubber stock to fit the various casings on the market and when inserted simulate the effect of an inflated inner tube. The "National" filler is one of this type, and is placed

What the Rubber Chemists Are Doing.

COEFFICIENT OF VULCANIZATION AS A CHECK ON THE STATE OF CURE.

DR. O. de Vries, Director of the Central Rubber Station at Buitenzorg, Java, publishes in "The India Rubber Journal" (January 20, 1917) a paper in which he presents proof "That the chemical process of the combination of rubber and sulphur is in itself quite independent of the physical one determining the position of the stress-strain curve."

Following is his presentation in condensed form:

The large differences in coefficient of vulcanization, noted by Schidrowitz and Goldsborough, are not found by Dr. de Vries in actual vulcanization practice, who points out that the percentage of combined sulphur does not increase at temperatures below 80 degrees C. On the other hand, the curve shifts its position even at ordinary temperatures, as shown by plotting the figures for the heating points after different lengths of time. These points are demonstrated by several series of experiments. The first, in which a number of samples of the same crêpe rubber were vulcanized together but tested at different times, shows only small changes in the coefficient of vulcanization, the percentage of combined sulphur not increasing perceptibly. The position of the curve (length at load of 1.30 kilograms) changes a total of 42 per cent in length and in this case carries with it practically no difference in coefficient of vulcanization. The same effect is reached by keeping a vulcanized sample for a longer time. It is not necessary to make experiments for many months at the ordinary temperatures, a few days at 70 to 75 degrees C. have the same effect. The curve proceeds lower down on the paper, just as it does when the time of cure is lengthened, but the percentage of combined sulphur remains the same. From these experiments it is clear that the reaction between sulphur and rubber, and the changes in the rubber-sulphur mixture which determine the mechanical properties as expressed by the stress-strain curve, are two different processes, which may proceed independently, and that, in general it is not feasible to make deductions from one regarding the other. It may be assumed that the mechanical properties are more important, and that the curve is a better gage to judge of the properties of the cured rubber than the chemical condition as expressed by the coefficient of vulcanization.

METHODS OF ANALYSIS.

NITROGEN IN RUBBER.

B. J. EATON and F. W. F. Day, in the "Agricultural Bulletin," Federated Malay States, August, 1916, describe their investigations on the distribution of nitrogen in coagulum and serum of *Hevea* latex. One hundred parts by weight of latex yielded 67 parts of wet coagulum and 33 parts of serum, the coagulum being lifted from the pan and allowed to drain for a short time before weighing.

Following are the weight percentages of nitrogen contents of the various portions: latex, 0.11; wet coagulum, 0.15; serum, 0.06.

The nitrogen content of the serum, which was contained in a tall, covered cylinder, fell after 14 days to 0.04 per cent, and after 60 days to an average of 0.03 per cent, after which no further loss appeared to take place.

One hundred parts, by weight of latex, yielded 67 parts by weight of unpressed coagulum or slab, and this on hand rolling was reduced to 50 parts by weight containing 0.26 per cent of nitrogen, equivalent to 0.78 per cent of nitrogen calculated on dry material.

Samples of similar coagulum were converted to sheet and crêpe on the day following coagulation with the following results:

One hundred parts, by weight of latex, yielded 19.7 parts of wet sheet containing 0.30 per cent nitrogen, equivalent to 0.35 per cent calculated on dry weight, which on drying was reduced to 16.9 parts of sheet containing 0.38 per cent nitrogen. Also, 100 parts, by weight of latex, yielded 21.3 parts of wet crêpe containing 0.30 per cent nitrogen, equivalent to 0.38 per cent of nitrogen calculated on dry material. This on drying was reduced to 16.9 parts of dry crêpe containing 0.40 per cent nitrogen.

Thus the nitrogen content of the dry sheet is only slightly lower than that of the dry crêpe. It was observed that the nitrogen content of the sheet and crêpe is about twice as great as that of coagulum left unpressed for a period of six weeks and then washed and crêped, and nearly twice as great as that calculated for the dry coagulum after keeping, showing that little or no alteration of nitrogenous constituents of the rubber has been effected in the sheet and crêpe, causing the formation of nitrogenous substances soluble in water or gaseous loss of nitrogen in any form.

METHODS OF TEST.

PHYSICAL TESTING OF RUBBER MATERIALS.

THE following methods are standard for the physical examination of vulcanized rubber goods as specified by the Board of Estimate and Apportionment of New York City.

SAMPLING. The contracting department shall select and take all samples for testing. The number of samples and the quantity to be taken from the deliveries will depend upon the size of the articles and the quantity delivered.

Samples shall fairly represent the delivery, and pieces shall be taken from not less than one per cent of the number of units delivered.

AVERAGES. The results of tensile strength, elongation and set tests as reported, shall be the average obtained from the samples received by the laboratory. Not less than three test pieces from each sample shall be tested and their results taken in calculating the average unless some individual result is apparently in error, in which case a retest shall be made.

TEMPERATURE OF TESTING ROOM. Physical tests of rubber shall be made with the temperature of the air not lower than 65 or higher than 90 degrees F.

TIME. All measurements of time shall be taken with an accurate stop watch.

PREPARATION OF TEST PIECES.

Test pieces of rubber shall be stamped out with a die, whenever practicable to do so.

TENSILE STRENGTH, ELONGATION AND SET TEST PIECES. Test pieces of rubber for tensile strength, elongation and set tests shall be cut out with a die, either of the constricted bar or ring type. The same test piece shall be used for making all three tests. When the bar test piece is prepared a die should be used that will make the constricted part of such a width that the cross section will be approximately one thirty-second of a square inch.

All pieces for these tests shall have the backing entirely removed, and any corrugations or irregularities of any kind shall be accurately buffed off to make a uniform smooth surface.

Test pieces which have become burnt in buffing shall be discarded.

Test pieces shall be kept constantly wet during the buffing.

Test pieces of rubber valves and odd-shaped rubber articles shall whenever possible be cut down on a lathe to an even thickness of not more than one-eighth inch and then cut out to shape for testing with a die.

If it is necessary to use naphtha to remove the backing or to separate the rubber from the plies, the naphtha shall be what is technically known as 76-degree Baumé, free from oil.

When naphtha has been used the test pieces shall be allowed to remain at rest for not less than one hour before testing.

In all cases where backing is removed and buffing done, the test pieces shall remain at rest for not less than ten minutes before testing.

FRICTION TEST PIECES. Test pieces for friction or adhesion tests shall be cut and prepared as follows:

All kinds of hose, round packing and similar articles shall be cut transversely unless the diameter is so small that a practical measurement cannot be taken, in which case the test pieces shall be cut longitudinally.

Belting, packing or gasket material may be cut in any direction.

Test pieces from washers, ferrules (sleeves) molded gaskets and other odd-shaped articles shall be prepared in the manner called for in the unit specification, if it is impracticable to prepare them in accordance with these rules.

Cotton rubber-lined hose test pieces and braided hose test pieces shall be accurately cut transversely two inches wide and full length of the circumference. They shall be cut through the walls so that they can be laid out flat the full length of the piece. One-quarter inch of the rubber lining shall be carefully and cleanly trimmed off on each side, without injuring the fabric, leaving a strip of rubber lining one and one-half inches wide undisturbed on a strip of cover two inches wide. A separation between lining and cover of this strip shall be started for about one and one-half inches.

Test pieces of wrapped hose, round packing and similar articles shall be accurately cut transversely one inch wide, and left circular, to permit sliding on to a mandrel. A separation between the rubber and the fabric or between the layers in accordance with the test to be made shall be started full width of the piece and far enough distant to permit proper fastening of clamps or hooks, as the case may be.

Solid round packing and similar articles shall have a core drilled out for the mandrel.

Fabric-backed rubber packing test pieces shall be prepared in the same manner as for cotton rubber-lined hose, except that if the rubber part is more than one-eighth inch thick, the test piece shall be prepared exactly opposite, leaving a strip of sheeting one and one-half inches wide on a strip of rubber two inches wide. A separation between sheeting and rubber shall be started for about one and one-half inches.

Belting test pieces shall be accurately cut one inch wide and shall be stripped down to all but two plies, and a separation of the two plies started for about one and one-half inches.

All pieces of flat material such as packing gasket, belting, etc., shall be cut not less than 12 inches long whenever possible.

DETERMINATION OF TENSILE STRENGTH.

The determination of tensile strength of the rubber compound shall be made as follows:

APPARATUS. All tensile strength tests shall be made on an apparatus the general design of which conforms to the Schopper machine.

GRIPS. When bar test pieces are used, the grips for holding the test pieces shall be such that they will tighten automatically, exerting a uniform pressure proportionate to the applied tension across the full width of the piece, regardless of any variation in the thickness of the rubber.

RING TEST PIECES. These shall be placed over the revolving rollers of the Schopper machine.

MARKING BAR TEST PIECE. The bar test pieces shall be stamped in center portion with two lines two inches apart, using a rubber ink pad stamp. The distance between the outside edges of these stamped lines shall be accurate to one one-hundredth of an inch.

MEASUREMENT OF BAR TEST PIECE. The width and thickness of the test pieces shall be accurately determined at three points equidistant between the marks, a spring gage or ratchet stop micrometer being used.

MEASUREMENT OF RING TEST PIECE. The width and thickness of the test ring shall be accurately determined at not less than four opposite points on the ring, care being taken to get the minimum cross section as near as possible, the area of which shall be used in computing the tensile strength.

BREAKING. Bar test pieces shall be tightly fastened in the jaws and brought just taut. The machine shall then be started and the speed so regulated throughout the entire test, that the jaws separate at the uniform rate of 20 inches per minute.

The number of pounds necessary to break the test piece shall be read to the nearest tenth of a pound and computed to pounds per square inch, using the measurements nearest to the break.

When breaking the ring test piece the ring shall be slipped over the revolving bearing provided for it and the procedure continued exactly as for the bar test piece, the speed being so regulated that it will give an equivalent elongation of test piece per minute.

TENSILE STRENGTH ACROSS THE SEAM.

Bar and ring test pieces shall be prepared as usual, except that the seam shall not be buffed off.

In cutting, the seam shall be centered in the middle of the bar test piece, at right angles to the axis, as nearly as possible.

The center of the seam shall be made to lie along a diameter of the ring test piece as nearly as possible.

The calculation shall be based on the average cross section in both kinds of test pieces in the usual manner, but excluding the cross section of the seam or seams.

ELONGATION AT THE BREAKING POINT.

The elongation at the breaking point shall be accurately determined during the tensile strength test as follows:

On the bar test a rule graduated to hundredths of an inch shall be kept opposite the two marks and the distance the outside edges of these two marks are apart at the instant of breaking shall be noted.

This distance shall be computed into per cent of elongation, i. e., if the marks are twelve inches apart at the break, that piece would have 500 per cent elongation.

RING TEST PIECES. These shall have the elongation read to the nearest whole per cent from the automatic record on the stretch tapes.

DETERMINATION OF SET.

The determination of set shall be on the test piece as broken in the tensile strength test not less than one nor more than one and one-half minutes after breaking. Time shall be taken with a stop watch.

BAR TEST PIECES shall have the distance from the outside of the line to the furthest broken point measured carefully along the axis on one broken portion to the nearest one-hundredth inch, and in the same manner from the corresponding nearest broken point on the other portion. The sum of these two measurements, minus two inches, is the actual set, and shall be computed to percentage of the elongation at rupture to the nearest tenth per cent.

RING TEST PIECES shall have the inner circumference carefully measured around a solid disk of the same diameter as the inside diameter of the original ring. The increase in length (actual set) is read to the nearest half per cent, divided by the per cent elongation at rupture, and the result recorded to the nearest tenth per cent.

DEFECTS.

If the break occurs outside the gage marks on the bar test piece during the tensile strength test, the specimen shall be considered as defective for any determination, and another test made.

The broken surfaces of both test bars and test rings shall be examined for flaws or defects, and if the results of the tests confirm the observation of flaws the test pieces shall be replaced by others.

(To be continued.)

CHEMICAL PATENTS.

THE UNITED STATES.

INSULATING COMPOSITION. A phenolic condensation product, initially fluid, transformable by heat without substantial change of volume into a homogeneous, impervious, and infusible solid of high insulating value. [Leo H. Bakeland, Yonkers, New York, assignor to General Bakelite Co., New York City. United States patent No. 1,213,144.]

PROCESS FOR RECOVERING RUBBER WASTE. The process of recovering rubber waste containing fibrous material, which comprises dividing the waste into small particles, disintegrating the fibrous material by treatment with acid, neutralizing the acid with a suitable base of an alkaline earth (in excess), working the resultant solid and liquid components into a homogeneous mass, and then adding a devulcanizing agent and a saponifiable oil. [Richard F. Kinsley, East Cleveland, John D. Morton, Lakewood, and Charles R. Haynes, Cleveland, assignors to Mechanical Rubber Co., Cleveland, all in Ohio. United States patent No. 1,215,941.]

TIRE FILLING COMPOSITION. A composition of the following ingredients: China wood oil, 72 per cent; chloride of sulphur, 8 per cent; oxide of magnesium, 7 per cent; comminuted cork, 13 per cent. [Clarence C. Turner, assignor to John A. Schmidtke—both of Portland, Oregon. United States patent No. 1,216,249.]

THE DOMINION OF CANADA.

VULCANIZED RUBBER ARTICLE. Vulcanized rubber having the structural characteristics of partially broken down rubber. [Canadian Consolidated Rubber Co., Limited, Montreal, Quebec, assignee of Claude D. Mason, Naugatuck, Connecticut, Canadian patent No. 172,568.]

VULCANIZED RUBBER PROCESS. Method of making vulcanized rubber by partially breaking down crude rubber to a sheet form with rugose structure and appearance and vulcanizing the sheet in such condition. [Canadian Consolidated Rubber Co., Limited, Montreal, Quebec, assignee of Claude D. Mason, Naugatuck, Connecticut. Canadian patent No. 172,569.]

RECLAIMING RUBBER WASTE. The process of reclaiming rubber waste containing lead and sulphur by adding a soluble reactive substance to the waste adapted to produce light-colored, water-insoluble compounds with the lead and sulphur. [Canadian Consolidated Rubber Co., Limited, Montreal, Quebec, assignee of Harold R. Murdock, Naugatuck, Connecticut. Canadian patent No. 172,570.]

VULCANIZING PROCESS. A new composition of vulcanized rubber free from lead sulphide and containing lead sulphate and zinc sulphide. [Canadian Consolidated Rubber Co., Limited, Montreal, Quebec, assignee of Harold R. Murdock, Naugatuck, Connecticut. Canadian patent No. 172,571.]

RECLAIMING RUBBER. In a process for the disintegration of fibrous cellular material the treatment of such material with a protein in the presence of heat. A reclaimed rubber compound containing decomposition products of albumin, carbohydrates and cellulose. [Canadian Consolidated Rubber Co., Limited, Montreal, Quebec, assignee of Harold R. Murdock, Naugatuck, Connecticut. Canadian patent No. 172,572.]

RECLAIMING RUBBER. A process involving the disintegration of fibrous cellular material, by treatment with a carbohydrate sugar and starch, having a non-fibrous structure and capable of hydrolysis under the conditions of devulcanization, the resulting products of which decompose the fibrous material. [Canadian Consolidated Rubber Co., Limited, Montreal, Quebec,

assignee of Harold R. Murdock, Naugatuck, Connecticut. Canadian patent No. 172,573.]

THE UNITED KINGDOM.

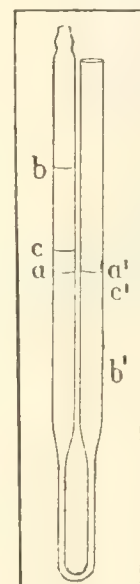
RUBBER COMPOSITION. For solid tires and mechanical goods a composition consisting of Congo rubber, 17; lithopone, 25; sulphur, $2\frac{1}{2}$; glycerin, $\frac{1}{4}$; finely powdered silica, $2\frac{1}{2}$ parts. [A. Nixon, Manchester, England. British patent No. 16,883 (1915).]

FILLING FOR TIRES. A composition consisting of preferably $4\frac{1}{2}$ pounds of glue, 3 pounds of water, 12 pounds of glycerine, 8 ounces of camphor dissolved in alcohol, and 8 ounces of formaldehyde, or its equivalent, is used for filling inner tubes of pneumatic tires. [J. Flint, G. Bolton, and W. A. McLaughlin, Cambera House, Elizabeth street, Sydney, New South Wales, Australia. British patent No. 14,272 (1915).]

LABORATORY APPARATUS.

VISCOSIMETER.

In viscosimeters of the Ostwald type it is customary to immerse the whole apparatus in a medium of high boiling point. The use of a fairly large quantity of some oil or wax, transparent at the temperature of observation, is thereby necessitated.



In the simple instrument devised by Allan Speedy, described in the "Journal of the Society of Chemical Industry," June 15, 1915, all difficulty in reading the marks is avoided by placing them above the surface of the liquid, which, therefore, need not be transparent and of which only a moderate quantity is required.

The instrument consists of a piece of glass tubing drawn out to form a capillary and bent into V shape, as shown in the figure.

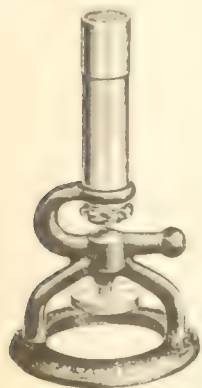
The liquid of which the viscosity is to be determined is placed in the viscosimeter, which is clamped vertically in the bath so that the level marks aa' , are just above the surface of the heating liquid. The bath is heated to the required temperature and after a few minutes the levels aa' , are carefully adjusted. By means of a piece of rubber tubing the liquid is then slowly sucked up the left limb of the tube until it passes the level, b . It is then allowed to descend. The time taken to fall from b to c is recorded by a stop watch and the experiment repeated as a check. It is only the viscosity of the liquid in the capillary tube that counts. Because of the thinness of the tube wall the temperature of the liquid is the same as that of the bath. It should be observed that the column of liquid bc , never reaches the capillary. The level, b' is well above the point where the constriction in the right limb of the tube begins. The time of flow is taken from b to c only, because on approaching a the motion becomes slow and irregular. The constant of the instrument can be obtained by calibrating it with pure phenol or sulphuric acid.

The instrument may conveniently be strapped to a thermometer and suspended in the heating liquid, which is contained in a boiling tube. The cheapness of the apparatus renders it possible to choose from a range of tubes one with a capillary of diameter best suited to the viscosity of the liquid which is to be investigated. The best results are obtained if the time of flow is about one to two minutes at the temperature of observation.

The instrument is well adapted to measuring the viscosity of rubber solutions, oils, solvents and other liquids. Its extreme simplicity, and the increased accuracy due to choice of a suitable capillary, as well as its convenience in use recommends it to all who have measurements of viscosity to make. These instruments are obtainable from Messrs. Townson & Mercer, Limited, Camomile street, London, E. C., England.

ADJUSTABLE HIGH-TEMPERATURE BURNER.

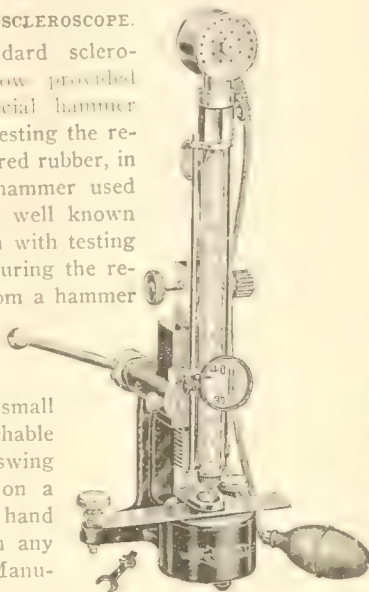
THE illustration shows a high-temperature burner adjustable both as to the air and gas supply, and suitable for use with any gas except acetylene. An important feature in this form of burner is that the flame may be controlled without changing the position of the crucible, due to the fact that the chimney does not move in its adjustment. It is particularly desirable in operations which call for a blast lamp. [E. H. Sargent & Co., Chicago, Illinois.]



THE SHORE SCLEROSCOPE.

The standard scleroscope is now provided with a special hammer for use in testing the rebound of cured rubber, in place of the diamond-pointed hammer used on metals. This instrument is well known all over the world in connection with testing the hardness of metals by measuring the rebound under a definite blow from a hammer raised and released pneumatically from a constant height.

The illustration shows the instrument mounted for testing small specimens. It is easily detachable from its base for operation on a swing arm for testing larger pieces on a bench. It may also be used free hand for testing still larger pieces in any location. [Shore Instrument & Manufacturing Co., New York City.]



CONTROL OF FACTORY OPERATIONS.

In an article on Factory Control and Research ("The Times Trade Supplement," London, December, 1916), Mr. W. A. Williams discusses the functions of the rubber chemist in relation to manufacturing problems. He suggests that laboratory control should be divided into three departments:

A. Dealing with chemical questions other than those concerned with actual operations, including all research work, the investigation of competitors' productions, the improvement of current manufacturing operations and the investigation and perfecting of new lines of manufacture.

B. Dealing with all actual production operation; control of the finished factory production, checking against specification and standard qualities, including control of power plant and steam raising.

C. Dealing with production of compounds for standard factory specifications, and investigation of new compounds.

The latter department should be equipped with a manufacturing plant on a small scale, with which all investigations of running and vulcanizing can be carried out, and where tests can be made, independent of the large-scale factory operations. These under no conditions should be interfered with. Experimental work should be kept entirely out of the factory. It is only when the experiments have been completed and standardized that the operations on a large scale should be adopted.

The functions of departments B and C are in connection with the daily work of the factory, in order to ensure smooth and efficient operation, and reliability of the finished products. Their operations are concerned with the manipulation of the grades of rubber employed in specific classes of articles and with the many other ingredients entering into manufacturing operations.

SCLEROSCOPE AND BALL REBOUND.

Contributed.

THE accompanying chart shows the relative rebound of various qualities of rubber pump valves, solid tires, vulcanite and other ordinary qualities.

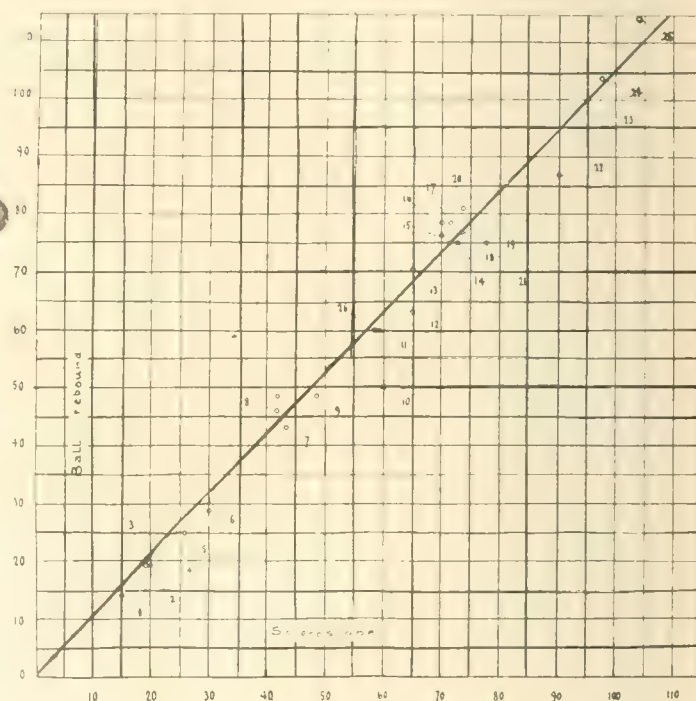
The tests were made in connection with a study of pump valves. The Shore Scleroscope was used with a special rubber hammer, having a small flat steel striking face in place of the usual diamond point used in tests on metals.

The ball rebound was obtained from the same rubber samples from which balls were cut, of three-quarter-inch diameter. These were dropped from a height of about 20 times their diameter onto a smooth cast iron base supporting a scale identical with that used in the scleroscope.

The different rubbers used differed widely in specific gravity and composition, but these differences do not influence the agreement of the rebound of the scleroscope and ball method.

The straight line drawn through the plotted readings passes from zero through 100, the rebound of a ball of pure unvulcanized Para rubber, whereas the scleroscope on this material showed 95.

Thus all scleroscope readings may be taken as representing 95 per cent of the height of rebound which could be obtained



with a ball made of the same rubber dropped from a height approximately 15 or 20 times the diameter of the ball.

The numbered plottings correspond to the following descriptive list of samples.

Numbers 1 to 6 inclusive are rather hard but of low elasticity.

All tests were made at 65 to 73 degrees.

LIST OF SAMPLES CHARTED.

- | | |
|---------------------|------------------------------------|
| 1. Pump valve. | 14. Solid tire. |
| 2. Pump valve. | 15. Slab. |
| 3. Pump valve. | 16. Solid tire. |
| 4. Pump valve. | 17. Solid tire. |
| 5. Pump valve. | 18. Solid tire. |
| 6. Pump valve. | 19. Slab No. 3. |
| 7. Bottle stopper. | 20. Solid tire. |
| 8. Pump valve. | 21. Para with 10 per cent sulphur. |
| 9. Pump valve. | 22. Slab No. 1. |
| 10. Solid toy ball. | 23. Unvulcanized Para. |
| 11. Solid tire. | 24. Pump valve (hard). |
| 12. Slab No. 2. | 25. Vulcanite. |
| 13. Solid tire. | 26. Eraser rubber. |

New Machines and Appliances.

AUTOMATIC STRENGTH AND ELASTICITY TESTER.

THIS instrument is constructed so that it generates its own power by the use of a weighted carriage, the speed being controlled by an oil filled cylinder. Thus the material to be tested is stretched in a uniform manner during the testing period. It is used for testing yarns, threads and both vulcanized and unvulcanized rubber.

This instrument is made for breaking strengths of from 5 to 3,000 grams or 1-5 of an ounce to 6½ pounds.

To improve the sensitiveness of this instrument its strength scale is made in two parts, one for the fine yarns having a breaking strength of only a few ounces, and the other for the coarser ones. For the latter an additional weight is added to the upper weight lever.

In this apparatus the piston rod is connected with a carriage which holds the lower set screw. To prevent vibrations this carriage glides on rollers along the standard and a special guide bar. This carriage is held in its upper position by a lever and it is in this position that the oil has to be poured into the cylinder, when setting up the instrument. The tests may be made in two ways, viz:

By either fixing a single length of thread, or threads, between the upper and lower screws, or by placing the threads upon a little wheel placed on same pin as the upper screw and tightening the two ends with the lower clamp screw. In the latter case a double length is tested and accordingly the strength result has to be divided in two, since two lengths are tested at one time.

The elasticity in both cases is shown for the single span and this is either in millimeters or inches and fractions and also in per cent directly.

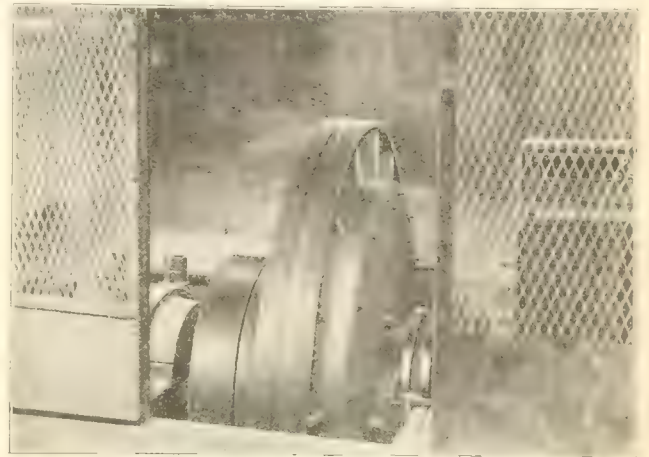
The strength dials are made either in English or metric system of weight. [Alfred Suter, New York City.]

A LARGE MAGNETIC CLUTCH INSTALLATION.

That all rubber mills should be provided with a positive, quick-acting clutch on the mill lines is without question. The danger of operatives being caught in the rolls is ever present, and in case of accident serious injury may be mitigated and the loss of life prevented by an efficient clutch installation. It is, moreover, an important power economy in that it gives gradual acceleration in starting the heavy mill rolls.

The illustration shows a 78-inch C. & H. magnetic clutch, with a capacity of 2,200 horse power at 100 revolutions per minute, that was recently installed in the plant of the Goodyear Tire & Rubber Co., Akron, Ohio. It is said to be the largest clutch of this type in the rubber mill service. The clutch consists of a solid circular steel casting mounted on the mill end of the shaft, having embedded in its periphery a single cylindrical magnetizing coil, the terminals of which are brought out to an ordinary pair of slip rings. Mounted concentrically with the coil and outer periphery is an adjustable friction ring so that the metal faces of the driving and driven member do not come directly in con-

tact with each other. This also serves the purpose of a permanent air-gap in the magnetic circuit. The other member of the clutch, keyed to the driven or rope-pulley side of the shaft through a flexible coupling, consists of a circular steel armature secured to the hub by a flat circular spring plate. When the mag-

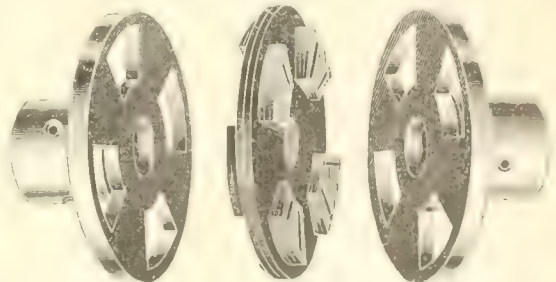


netizing coil is energized, this circular armature is drawn towards the driving member of the clutch, the motion along the shaft being accomplished by a slight dishing of the spring plate upon which it is mounted. This particular form of clutch possesses the advantage of instant disconnection in case of interruption of the magnetizing current, and does not require a portion of a revolution for its disengagement. There is no tendency, moreover, for it to either release or to lock itself due to the mechanical forces exerted as it comes up to speed and while it is running at full speed.

There is a slack cable switch mounted in a frame on the right of the clutch connected to a rope and overhead torsion rod, which automatically causes the clutch to disengage in case any of the driving ropes of the main steam engine drive should break. [The Cutler-Hammer Clutch Co., Milwaukee, Wisconsin.]

THE GRUNDY FLEXIBLE INSULATED COUPLING.

Where it is difficult to get the shaft bearings in perfect alignment, or where they are liable to get out of line, the simple and effective device here shown is recommended for connecting the two ends of the shafting. It is constructed of three pieces,



the two outer flanges being of cast iron and the center disk of leather or hard fiber with lugs on each side for transmitting the power to the outside flanges.

The leather lugs are cut on a bias, tapering towards the disk, the cast iron driving flanges being machined with a corresponding taper, which has a tendency to draw the flanges close to the disk, and to cause the leather lugs to receive and transmit the power at their strongest points.

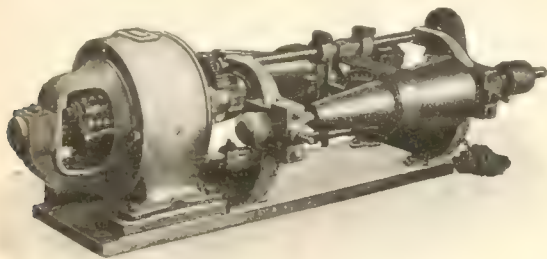
The close connection made possible by this type of coupling,

reduces to a minimum the leverage so objectionable in the ordinary coupling. They are furnished in standard sizes, from $\frac{3}{4}$ to 500 horse power at 100 revolutions per minute. [Charles Bond Co., Philadelphia, Pennsylvania.]

MOTOR DRIVEN VARIABLE SPEED DRIVE.

Changes in speed are very necessary in a large number of mechanically performed operations in rubber goods manufacture, hence the demand for a progressive or variable speed changing driver. In the larger and more modern mills, calenders are invariably driven by motors provided with effective controllers of the electrical type that provide a wide speed variation. There are, moreover, many machines outside of the calender room where varying speed conditions may be met in a satisfactory manner by a motor-driven speed change device of the type shown in the accompanying illustration.

This device consists essentially of a pair of cone pulleys, over which runs an ordinary leather belt. Under the belt the surface of each cone is built up from conical to cylindrical form by a patented cone pulley transformer. Each consists of a series of tapering leather strips riveted to an endless belt, the strips being so formed as to give a crown like that of an ordinary pulley.



To effect a change of speed these transformers are shifted along the cones, without stopping the machine, by a screw and chain, as the illustration shows.

While they are in contact with a cone they run exactly as if a part of it. The angle of the cones is such that there is no tendency to slip or creep endwise. The belt may be of any desired width up to the full width of the transformers.

These speed changes are furnished complete in vertical or horizontal countershaft types for floor or ceiling attachment, and from 1 to 200 horse power. [The Moore & White Co., Philadelphia, Pennsylvania.]

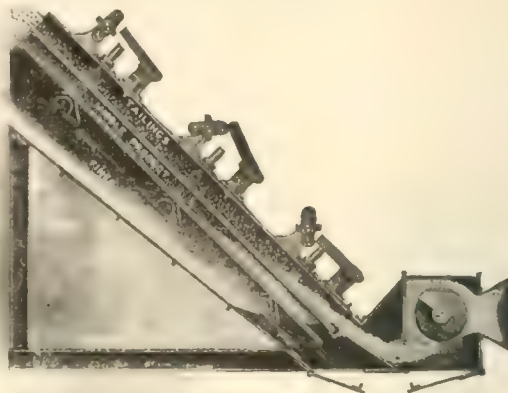
THE NEWAYGO MECHANICAL SCREEN.

In the preparation of rubber dust and other finely divided products used in the manufacture of hard rubber and composition soles and heels, the mechanical screen plays an important part. In some cases it is necessary to remove the fiber from the rubber. In others, a certain portion of the fabric is retained in the finished product, while in the case of hard rubber grinding, there is no fiber to contend with. These variable conditions and final products are controlled by a mechanical screening process.

The material is first broken down to about $\frac{1}{4}$ to $\frac{1}{2}$ inch on a cracker and then passed through a 42-inch horizontal grinding mill from which it is delivered to a screen that takes out the fiber and the 40-mesh material. The tailings are then passed through a second mill and over a second screen that removes the 40-mesh material and completes the screen operation.

The distribution of the feed over the entire width of the screen cloth is effected by a screw conveyor and an adjustable feed board at the top of the machine. The various products are taken away at the bottom of the screen. These machines are constructed with one, two and three screening surfaces and, therefore, can deliver from one to four products from a single separator.

Practically no power is required to drive them. In fact, 1 horsepower runs the largest size. The capacity is very large as the entire screening surface is in constant use and the meshes are

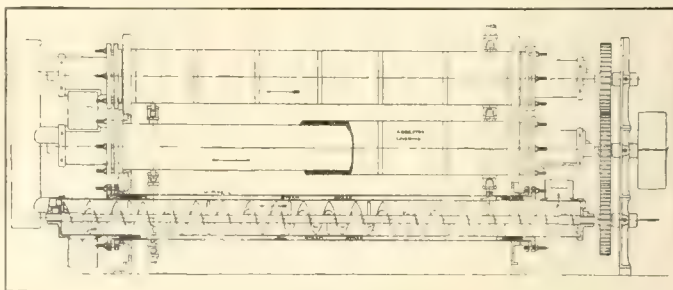


kept open by mechanical vibration thus allowing the fine material to pass through the screen.

It is practically dust-proof and fire-proof as practically no wood is used in the construction. [Sturtevant Mill Co., Boston, Massachusetts.]

THE WOLF VACUUM STEAM DRYER.

The process of drying reclaimed rubber and the elimination of all moisture in the dry fillers and other materials used in rubber manufacture is of well known importance to the trade. The Wolf vacuum steam dryers are constructed in units and a side elevation of the three-cylinder type is shown herewith. The outer shells of the cylinders are covered with asbestos, while the inner shells are machined and contain spiral conveyors of the rubber type provided with unifying paddles at each flight. Steam is piped to the chambers between the inner and outer shells and an efficient steam trap removes the condensation.



The material to be dried is delivered to the top cylinder in which it is agitated continuously and conveyed in the same manner through the succeeding chambers and finally discharged in a uniformly dried condition. All gears are provided with gear guards and the drive end is supported by outboard bearings. [The Wolf Co., Chambersburg, Pennsylvania.]

SPECIAL MACHINES.

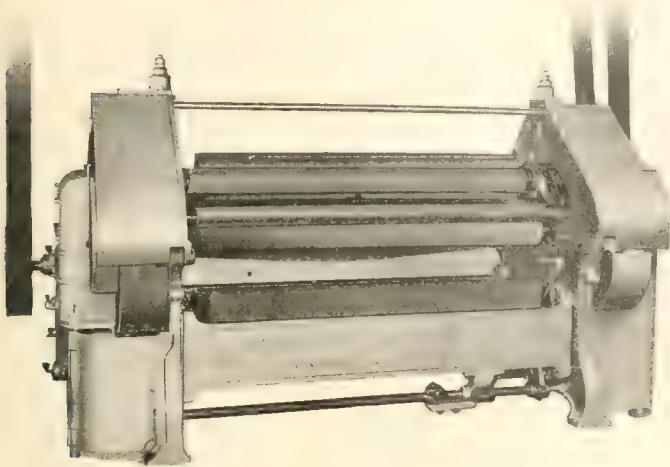
RUBBER AIDS IN UNHAIRING HIDES.

THE removal of hair from hides is an important process in the tanning industry and one that at first thought would not appear to be particularly difficult. Yet when a hide varies in thickness from $\frac{3}{16}$ to $\frac{9}{16}$ of an inch the operation requires considerable skill. For that reason experienced workmen with special knives were formerly thought indispensable in removing the hair without cutting the hides.

When unhairing machines were first used the difficulty of allowing for variations was apparent, the human element being eliminated. Now it appears that rubber is called upon to replace the hand workman's intelligence. Rubber rolls of soft vulcanized

stock, rubber cylinders with air-filled centers and endless, soft rubber bolsters are now in general use.

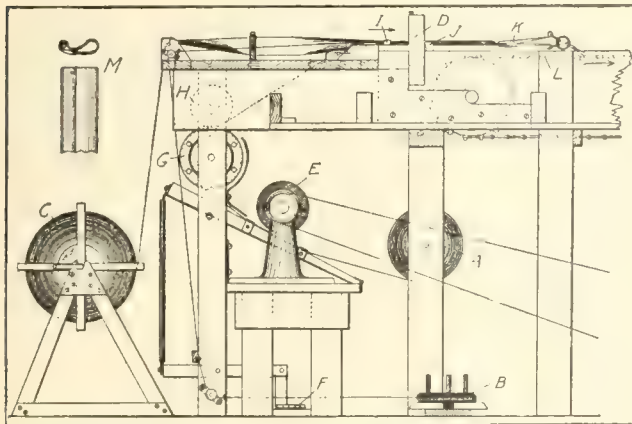
In operation the hide is passed over the rubber cylinder or



bolster against which it is held by a feed roller. The rubber bed yields to the surface inequalities, while the operating blades completely remove the hair from the hide.

MAKING WEATHER-STRIPS.

One of the many minor lines of manufacture in which rubber forms an important part, is that of the ordinary weather-strip for doors and sashes. Such strips generally utilize only low grade reclaimed stock in the form of rubber-coated thin fabric and light cloth insertion packing. The rubber is combined with



wood or metal strips in the form of an open tubular fold, with the edges held securely in the body of the strip. In making the double edge wood strip, the rubber sheeting is first cut accurately into strips in a slitting machine. The edges are glued and the strips are inserted in grooves in the wooden strips cut to receive the glued edges of the rubber. The most common form of weather-strip is that made by folding the rubber into strips of sheet brass, zinc or copper. This form is inconspicuous when applied and is the only kind adapted to many locations, such as around sashes of railway coaches for excluding dust and preventing vibration. These weather-strips vary in width from $\frac{3}{8}$ to $\frac{7}{8}$ of an inch and are often made in continuous lengths of 100 feet.

The manufacture of weather-strips is accomplished in automatic machines with special dies and folding devices to form the flat metal ribbon around the rubber, with the edges folded in such a manner as to avoid cutting the rubber. After forming the strip the machine automatically punches holes at regular

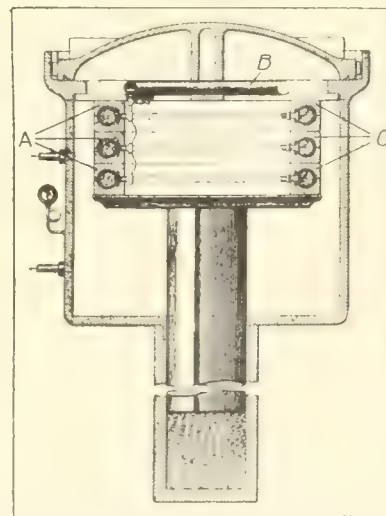
intervals in the metal for tacking the weather-strip in place.

The machine shown in the illustration takes the metallic strip from a stock roll and folds it over a strip of rubber or other flexible material. The feature of this machine is a die, through which the metal and rubber strips are simultaneously drawn, and which folds the metal over the rubber. *A* is the strip of metal formed in a roll and mounted on the frame of the machine. *B* is a coil of wire which passes through the die and forms the reinforcement for the completed strip. *C* is a roll of rubber of suitable width. These three parts are passed over suitable guides and into the forming die *D*, which folds the metal strip around the wire and clamps the rubber strip. As the metallic strip *A* is unwound from the stock roll it passes under a buffing wheel *E*, being forced up against this wheel by means of a pedal *F*. The strip then passes between rollers *G* and *H* and thence to the guide *I* where it meets the wire and strip of rubber. As the metallic strip passes between rollers *G* and *H*, it is perforated at certain distances apart by means of punches located in the rim of the roller *G*. The three parts pass through the guide *I* and thence through the forming die. As the completed strip emerges from the die, it passes over a varnishing or lacquering device *J*, which covers the metal parts of the strip with a protecting coat. After the first few inches of completed strip is formed, the end is attached to a clamp *K*, which is hooked into a sprocket chain *L* driven in the direction indicated. As soon as a sufficient length of strip is pulled through the die by means of the sprocket chain, or when the end of the chain is reached, the strip is cut off near the die and the clamp is returned and again attached to the new end of the strip, after which power is applied to the chain to force additional stripping through the die. A section of the completed strip formed by this machine is shown at *M*.

MACHINERY PATENTS.

INTERNAL PRESSURE TIRE VULCANIZING MOLD.

UNDER certain conditions the use of steam, air or water as internal pressure producing agents in curing tire casings has resulted in permeation of the structure. This is obviated in the present invention by maintaining the water that fills the casings under hydraulic pressure, while the expansion due to the heat of vulcanization is controlled in a special expansion chamber.



The illustration shows an ordinary press vulcanizer in which are stacked the molds *A* containing the tires to be cured. Previous to bolting down the head, water under pressure is conducted to the individual molds and the compression chamber *B*, and the air in the tires is forced out through valves *C*. The compression chamber being closed, the air cannot escape and is hydraulically compressed in the chamber serving as a cushion that compensates for the expansion of the water in the tires. [Nelson W. McLeod, St. Louis, Missouri, assignor to American Motors Tire Co., Detroit, Michigan. United States patent No. 1,213,224.]

In a previous invention granted to the same inventor and the same assignee, water is compressed in a cylinder provided with a piston and coiled adjustable spring that controls the ex-

pansion of the water during vulcanization. [Nelson W. McLeod, St. Louis, Missouri, assignor to American Motors Tire Co., Detroit, Michigan. United States patent No. 1,213,224.]

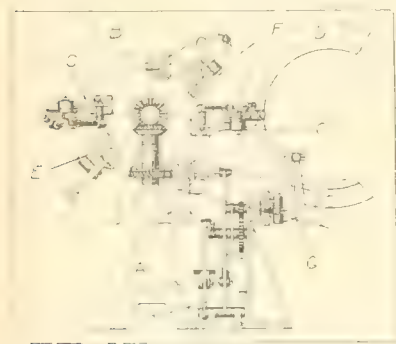
IMPROVED HOSE WRAPPING MACHINE.

According to the customary practice in wrapping garden hose prior to curing, the movable roller is lifted by the increasing diameter of the wrapped hose and mandrel. This often results in the exterior of the hose being permanently marked in an objectionable manner when the hose is cured.

Referring to the drawing, which is an end elevation of the improved machine, *A* is the pole and hose supported by rollers *B* and *C*. The cloth wrapper *D* is placed upon the front roller *B*, and water under pressure is admitted to the three cylinders, only one of which is shown at *F*, thereby lowering the roller *G* into contact with the uncured hose. The cam *H* is then brought in contact with the wedge block *I* which maintains the roller *G* in a permanent position. The wrapper is thus wound on the hose between three rollers that are relatively stationary and as the diameter of the wrapping increases the hose is compressed on the pole and retained in this condition during vulcanization. Thus a more solid and compact hose body is produced and one free from all exterior markings or imperfections. [William P. McGeouch, Arlington, Massachusetts, assignor to Boston Woven Hose & Rubber Co., Cambridge, Massachusetts. United States patent No. 1,213,665.]

THE GRIFFITH MECHANICAL STITCHER.

In this machine the operation of stitching or shaping the fabric down around the sides of the core is mechanically and automatically performed in a smooth and even manner.



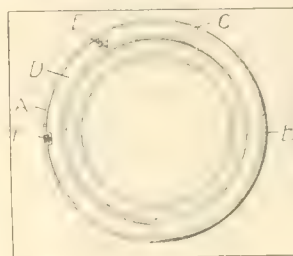
The drawing shows a side elevation of the machine and the base *A*, that supports the driving mechanism. *B* is a turret that revolves in a vertical plane on opposite sides of which are bolted four co-acting pairs of stitching tools *C*. As each successive pair of tools comes into operative position on each side of the core *D*, it shapes or stitches the fabric further around the core, a revolution of the turret completing the stitching of one fabric ply.

After a certain number of plies have been laid on the core, bead ring applying rolls *E* are brought into position and the bead rings are placed by being fed between the rolls and the revolving core. When the fabric plies are to be trimmed the device *F* is positioned and the cutting effected by the rolling action of the cutters, the requisite pressure being obtained by spring adjustment. The machine thus described is adapted to stitch the fabric plies on the core and under the bead rings, to apply the latter and stitch other plies down to the bead rings. Before the trimming is done the outer layers are stitched around

the bead rings by a pair of disks carried by arms *G*, and operated by treadle *H*. [Richard Griffith, assignor to the Miller Rubber Co.—both of Akron, Ohio. United States patent No. 1,212,207.]

SELF-CONTAINED INTERNAL PRESSURE TIRE CORE.

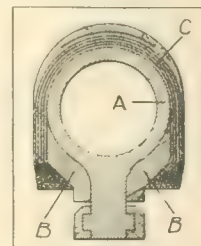
In curing tires when internal pressure is applied from a general source the necessary pipes and couplings and the possibility of leakage are features more or less objectionable. In this invention the gas or vapor under pressure is confined within the core until liberated by the action of a fusible plug.



The core is formed in three hollow sections *A*, *B* and *C*. Sections *A* and *B* are similarly constructed and the description of the former therefore will apply to the latter. The hollow chamber *D* is provided with an inlet valve *E* through which air or gas under pressure is forced; moreover, water may be introduced. The thermostatic valve, *F*, comprises a disk that is fused by the vulcanizing heat, liberating the compressed air or vaporized water which expands the casing forcibly within the mold. [Henry Z. Cobb, Winchester, Massachusetts, assignor to United States Rubber Co., New Brunswick, New Jersey. United States patent No. 1,211,918.]

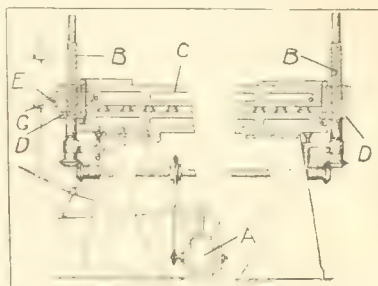
TIRE CORE WITH NON-METALLIC ANNULAR PADS.

The object in this device is to provide mechanical means whereby the fabric of the tire is stitched or expanded in the vulcanizing mold. The ring core *A* is provided with two lateral annular rings or non-metallic pads *B* and the fabric plies *C* are laid on the core, the beads applied and the casing finished in the usual manner. Before curing, the pads are removed and the casing is placed in the mold, annular parts of which engage the head flanges, forcing them in contact with the core proper. This movement stretches the casing equally from each side wall to the center of the tread, in which condition the casing is vulcanized. [Burgess Darrow, assignor to the Good-year Tire & Rubber Co.—Both of Akron, Ohio. United States patent No. 1,212,457.]



GRAY'S VULCANIZING PRESS.

In a press for vulcanizing molds, pressure is produced by the weight of the upper platen, either by itself or with dead weight placed thereon, the mechanism for raising and lowering being



incapable of producing any downward thrust. In the form shown, the upper platen is moved by a motor *A* through screw-and-nut gear *B*, *B*, the nuts which fit loosely in the steam heated platen *C* being provided with flanges *D*. The motor stop-gear consists of a projection *E* on the platen which trips the lever *G*. Instead of nuts, chains or other flexible means may be employed for raising and lowering the plate. [Christian H. Gray, India Rubber, Gutta Percha & Telegraph Works Co., Silvertown, Essex, England. British patent No. 102,272.]

OTHER MACHINERY PATENTS.

THE UNITED STATES.

- 1,213,223. Tire press vulcanizer. N. W. McLeod, St. Louis, Mo., assignor to American Motors Tire Co., Detroit, Mich.
- 1,213,225. Pneumatic tire mold. N. W. McLeod, St. Louis, Mo., assignor to American Motors Tire Co., Detroit, Mich.
- 1,213,525. Collapsible core. R. M. Merriam, Akron, Ohio.
- 1,213,600. Tire and method of making the same. W. H. Dunkerley, Paterson, N. J.
- 1,213,601. Tire braiding machine. W. H. Dunkerley, Paterson, N. J.
- 1,214,277. Apparatus for vulcanizing tire shoes. H. Z. Cobb, Winchester, Mass., assignor to United States Rubber Co., New Brunswick, N. J.
- 1,214,295. Method and apparatus for cutting rubber blanks. J. R. Gammett, Akron, Ohio, assignor to The B. F. Goodrich Co., New York City.
- 1,214,888. Tire casing mold. W. H. Burritt, St. Louis, Mo.
- 1,215,648. Tire forming apparatus. R. T. Griffith, assignor to The Miller Rubber Co.—both of Akron, Ohio.
- 1,215,680. Tire remover and replacer. A. N. Mason, Paducah, Ky.
- 1,215,828. Mold for making pneumatic tires. N. W. McLeod, St. Louis, Mo., assignor to American Motors Tire Co., Detroit, Mich.
- 1,215,910. Pressure cure vulcanizing apparatus. M. H. Clark, Hastings-on-Hudson, N. Y., assignor to Boston Rubber Shoe Co., Boston, Mass.
- 1,215,934. Cross wrapping machine. O. A. Heckman, Akron, Ohio.

THE DOMINION OF CANADA.

- 172,649. Collapsible core. D. R. Hanawalt, Akron, Ohio.
- 172,829. Repair vulcanizer. A. B. Low, Denver, Colo.
- 172,830. Repair vulcanizer. A. B. Low, Denver, Colo.

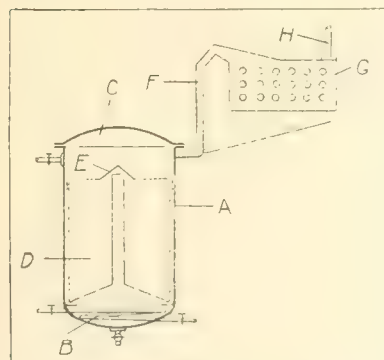
THE UNITED KINGDOM.

- 12,943 (1915). Apparatus for removing air from rubber compound. W. J. Mellersch-Jackson, 28 Southampton Buildings, London. (Rubber Regenerating Co., New York City.)
- 13,139 (1915). Rubber sole laying machine. W. J. Mellersch-Jackson, 28 Southampton Buildings, London. (Boston Rubber Shoe Co., Boston, Mass.)
- 13,141 (1915). Rubber footwear stitching apparatus. W. J. Mellersch-Jackson, 28 Southampton Buildings, London. (Boston Rubber Shoe Co., Boston, Mass.)
- 13,682 (1915). Apparatus for curing and coagulating rubber latex. Rubber Curing Patents Syndicate, Norwich Union Buildings, St. James' street, London, and F. A. Byrne, 2 Ludgate Hill, Birmingham.
- 13,776 (1915). Bearings for the rollers of a rubber mill, etc. Naamlooze Vennootschap Deventer IJzergieterij en Machine-Fabriek Voorheen, J. L. Nering Bogel & Co., and R. van Vloten, Deventer, Netherlands.
- 102,178. Apparatus for the manufacture of rubber and like tubing. H. Wade, 111 Hatton Garden, London. (B. B. Goldsmith, New York City.)
- 102,443. Clamp for use in securing leather or rubber soles to shoes by cement. H. Umbers, 29 Vernon street, and E. G. Dolman, 22 Ringley street—both in Harpurhey, Manchester.

PROCESS PATENTS.

FRENCH PROCESS FOR RECLAIMING BOTH RUBBER AND FABRIC.

METHOD for integrally removing rubber from the canvas of worn out pneumatic tires. This method permits the complete



recovery of the rubber contained in the cloth which, entirely freed from rubber, may then be used again.

To obtain this result, the rubber scrap is treated with a dissolvent, for instance, xylol, subjected to powerful agitation while at the same time kept at a high temperature.

This agitation is produced by violent ebullition

of the xylol in a vacuum at from 100 to 110 degrees, combined with circulation of the liquid obtained by an arrangement similar to that used in ordinary lye-washing machines.

The drawing shows a sectional elevation of the apparatus which consists of a digester *A* in the bottom of which is arranged a steam coil *B*. This heating *A* can also be effected by means of the

steam jacketed casing. Inside the digester, covered with a movable lid *C*, is a removable basket *D*, provided at the upper part and the center with caps *E*. In this basket is placed the material from which the rubber is to be removed after first being washed.

The upper part of the digester *A* communicates by means of a pipe *F* with a reflux condenser *G*, which returns to the digester the liquid resulting from the condensation of the steam. A tube *H* connects the condenser with an exhausting-pump.

After the cloth has been freed from rubber, it is placed in a washing-machine with cold xylol. This removes the particles of rubber still adhering to the cloth and also the resin and free sulphur.

The impure xylol resulting from this operation may be advantageously employed to swell the rubber in the preliminary treatment of the tires, always, however, after it has been filtered to free it from the particles of rubber. After the cloth has been rinsed in the washing machine, it is put into the basket *D* and this is placed into the digester *A* containing clean xylol.

A vacuum is produced in the digester and heat to about 110 degrees is applied, producing violent ebullition. When the operation is judged to be concluded, the digester is emptied and a second operation begun.

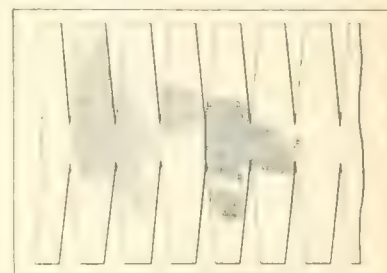
All liquids with which cloth containing rubber in dissolution has been treated after the manner just explained, will still serve to effect the dissolution of rubber particles.

By the above method, the freeing of cloth from the rubber is almost integral; but to obtain a perfect result, a fresh quantity of xylol is added in the digester and the temperature is brought to about 150 degrees under pressure for a certain length of time. When the operation is concluded the cloth is replaced in the washing machine, is washed, rinsed and finally dried in a current of warm and inert gas. [H. Debaugé. French patent No. 481,293 (July 20, 1915).]

A NOVEL TIRE FABRIC CONSTRUCTION.

Under present conditions tire-building strips are cut on the bias from tire fabrics of standard widths, but the length of the strips is relatively short and limited to the width of the fabric.

This invention provides a strip that may be cut lengthwise or transversely of the weave and in width somewhat greater than the transverse circumference of the tire. As seen in the illustration, the longitudinal edges are serrated and the free ends of the flaps are so spaced that when the strip is wound circumferentially around the core and the edges brought down against the sides, the edges of the flaps will meet. When the strip is cut longitudinally of the fabric one length may be used to construct an entire casing. [Robert M. Merriman, Akron, Ohio. United States patent No. 1,213,929.]



OTHER PROCESS PATENTS.

- 1,213,905. Process for vulcanizing plastics. C. J. Randall, Naugatuck, Conn., assignor to Boston Rubber Shoe Co., Boston, Mass.
- 1,215,275. Woven rubber fabric. A. H. Henderson, assignor to The Henderson Rubber Co.—both of Baltimore, Md.

THE DOMINION OF CANADA.

- 172,679. Method of producing double texture fabrics. J. Meade, Stoughton, Mass.

THE UNITED KINGDOM.

- 12,944 (1915). Forming rubber articles by dipping. W. J. Mellersch-Jackson, 28 Southampton Buildings, London. (Rubber Regenerating Co., New York City.)

New Goods and Specialties.

BATHING CAPS FOR THE COMING SEASON.

THE new bathing caps are more bewitching than ever and at the same time more serviceable. A practical and attractive cap for every bathing purpose is a white tailored diving cap

which is decorated in various ways, the style shown having for its ornament a hand-painted bird in solid color or combinations—a white bird with blue painting, a black bird with red painting, a red bird with black painting, or a plain blue bird.

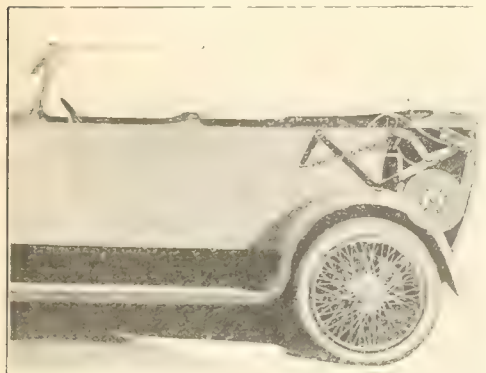
The all rubber sun hat shown in the second illustration affords protection for the face, is very becoming and consequently appealing to feminine buyers, yet preserves its original intent to protect the hair and ears while in the water, by means of a tightly fitting inner head-band. This cap is ornamented with a large button on top and a ribbon and buckle ornament at the side. It is furnished in black, red, blue and green, with trimming to harmonize.



Another brim hat with an inner head-band is made on strictly tailored lines, in black, red, blue and green, with a ribbon and bow in harmonizing colors. [The Faultless Rubber Co., Ashland, Ohio.]

THE "NO-MAN" TOP FOR AUTOMOBILES.

An engine-operated motor car top recently placed on the market may interest manufacturers of rubberized materials, since it can be made of any material used for car tops. This



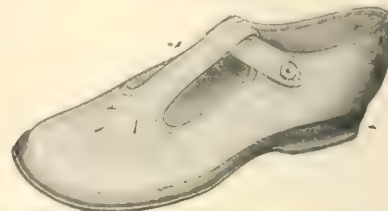
top works on the principle of an ordinary roller window shade and can be easily drawn up in place by the driver, without even stopping the car, or lowered and concealed in the specially designed compartment back of the tonneau where it is protected by a waterproof cover which gives the car a finished appearance.

Side curtains are also provided, working on the same prin-

ciple, which may be pulled down and fastened at a moment's notice. The illustration shows the position of the "No-Man" top when rolled up in the tonneau. [Automatic Auto Top Co., Chicago, Illinois.]

BAREFOOT SANDAL WITH RUBBER SOLE.

The practical sandal type of footwear has grown increasingly popular for adults as well as children, and the well-built and attractive model here shown is being introduced at an opportune time. It is of high-grade construction on a specially designed last. The uppers are of pure white canvas and the soles of white rubber. This new sandal is supplied in women's, misses' and children's sizes. [Apsley Rubber Co., Hudson, Massachusetts.]



RAINCOAT FOR 1917.



The maker of this smart new model in ladies' raincoats maintains a corps of experts designers and living models to assist in producing superior creations in waterproof clothing. The coat here shown is semi-close fitting, single-breasted, with nine buttons, arranged in groups of three. Its special features are a Prussian collar, yoke and side pleats front and back, fancy cuffs and two side pockets with flaps, lending an air of style and individuality to the garment that makes it suitable for wearing over the daintiest gown, the full length cut giving complete protection. [The B. F. Goodrich Co., Akron, Ohio.]

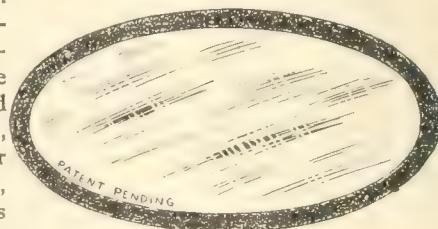
THE "STIK-TITE" BACK CURTAIN WINDOW.

In the "Stik-Tite" window a fabric strip made of automobile rubber, or whatever fabric is used for the car top, is attached by rubber gum to the transparent celluloid forming the window proper.

This window is applied to the back curtain of the car by the rubber gum and held absolutely secure, without stitching or fasteners of any kind, the whole process being handled in the

same manner as putting a cold patch on an inner tube.

These windows are made in various shapes and sizes, to suit the different makes of cars. They weigh only three ounces, are neat in appearance, and it is claimed that they outwear several old-style windows and also protect and



strengthen the curtain. [The Cincinnati Auto Specialty Co., Cincinnati, Ohio.]

"FLOSSY" DENTAL FLOSS HOLDER.

The use of dental floss is universally recommended by dentists and this newly invented floss holder, made of hard rubber, ebonite or French ivory, is claimed greatly to facilitate the operation of cleaning the interstices between the teeth where no toothbrush can reach, and to act as an economizer in the quantity of floss used. The floss container is held within the circle and the thread attached to each arm of the "Flossy" by being passed around the patented non-slip floss holding means with which the arms are provided. A thread-cutting device is so arranged that the used portion of silk is severed and discarded. In operating this simple little instrument the fingers need not enter the mouth and there are no metal parts to irritate the gums. Each outfit consists of one "Flossy" and a supply of medicated, perfumed, waxed silk dental floss contained in a sanitary rubberoid pocket case. [The Makers of Flossy, Evanston, Chicago, Illinois.]



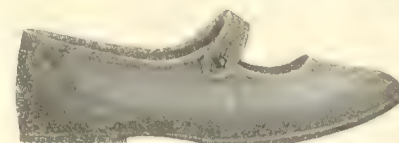
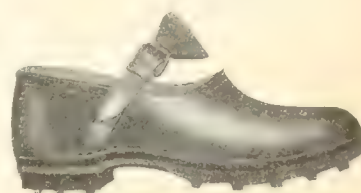
fountain pen equipped with fountain pen feed. The old-style inner air tube and leaky ink joint are replaced by the most desirable features of the standard fountain pen, such as a capillary saw for



carrying ink, a modern self-filling device in connection with the rubber sac, and proper feed ventilation. [Bird-Bill Pen Co., New York City.]

FISHING BROGUES AND SAND SHOES.

The stout rubber shoe and slipper, with buckle strap, shown in the accompanying illustration, appeal to the fisherman who knows that wet weather is fish weather, and who seeks a foot-covering suitable for the moist and marshy byways he must tread in pursuit of his finny prey. They are stout and serviceable, yet devoid of clumsiness,

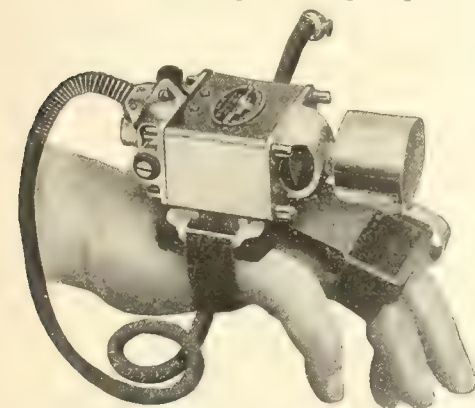


the studded soles preventing danger of slipping. These brogues are made entirely of rubber, or with leather half-soles if desired.

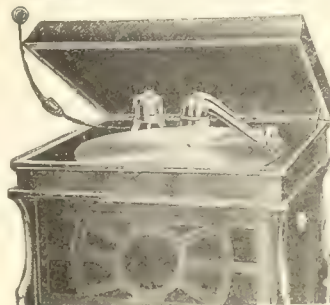
The rubber sand shoe for women, misses and children, also shown, is neatly bound, fastening with a strap and one button. The corrugated heel affords a safe foothold. These are supplied in black, brown, gray and white, with leather insoles if desired. [The North British Rubber Co., Limited, Edinburgh, Scotland.]

VIBRATORY MASSAGE OUTFIT AND PHONOGRAPH MOTOR WITH SPONGE RUBBER.

Vibratory massage is a deservedly popular form of treatment for men after shaving or shampooing and for women in connection with facial and scalp treatments, and a new machine has recently been devised for this purpose whereby a complete motor apparatus may be placed on the back of the operator's hand. The convenience of this portable hand massage machine is readily apparent,



since it weighs only 18 ounces and can easily be carried in the pocket, cord and all. It is held on the hand by two elastic straps, and a block of sponge rubber beneath each strap serves effectually to reduce the jar in the hand and arm of the operator. The machine is wound to operate on any lighting circuit, alternating or direct, 100 to 120 volts, 60 cycle or less, and a speed-regulating rheostat is included with each outfit.



At the end of the vertical motor shaft of the "Shelton" electric talking machine or phonograph motor, also shown, there is a soft rubber wheel which contacts with the edge of the table for driving the motor, in place of the usual hand-operated spring mechanism. [Shelton Electric Co., Fort Wayne, Indiana.]

"B. B. STYLO" FOUNTAIN PEN.

The stylographic pen here shown embodies a radical departure in stylographic construction and is claimed to be admirably adapted to the needs of the modern business public. The "B. B. Stylo" combines a stylographic point with a modern self-filling

The best diving suit material is utilized in the life preserving outfit here illustrated. It is made in the form of a union suit, covering the feet and hands also and being provided with bands of rubber about the wrists, neck and ankles. The suit is drawn on through an opening in the breast portion and the shoulder portion is drawn over the head, which passes through the soft rubber neck portion, made water-tight by a soft rubber strap. The sleeve of soft rubber forming the opening into the suit is then drawn together by the wearer and doubled, and a strap is wrapped around the folded sleeve, making it absolutely water-tight. Around the body of the suit are cork-filled pockets.

The shoes are weighted with five pounds of lead, to insure an upright position in the water, and the head and shoulders remain out of the water. The head mask, which is used in case of very rough weather to prevent the wearer from being smothered, is provided with ordinary transparent goggles and is tied around the neck with a flexible string.

The entire outfit can be put on in a minute's time, and it is claimed that the wearer will be kept perfectly warm and dry, and that even in case of puncture the suit will still prevent the wearer from sinking. [The Aud Co., Inc., Herndon, Virginia.]



ANTI DRAFT SHIELD AND AUTO BUCKET.

The upper illustration shows a windshield cap made of 32-ounce enameled rubber duck, designed especially for Ford cars, to fit the space between the windshield and the top of the car through which drafts, rain and snow have access to the driver. The "Powers" Anti-Draft shield is furnished with strong, spring clips which fasten to the wind-shield and

curtain fasteners with eyelets that attach it to the top of the car. This handy accessory is of good appearance and adds greatly to the comfort of motor driving.

"Hinson's" textile auto bucket, also shown, is not merely collapsible but when not in use folds into a neat, flat package which can be put under the car seat or in the tool box and which can be unfolded instantly when required. It is made of khaki waterproofed duck, specially treated, and has a strap handle 15 inches long over the top. This bucket holds about 2 gallons. [The Powers Manufacturing Co., Waterloo, Iowa.]



SHOWING BUCKET IN USE



SHOWING BUCKET WHEN FOLDED

RAIN VISION TRUCK SHIELD.

This sectional view of a rain vision shield specially designed to meet the requirements of commercial cars or trucks shows how the 1/4-inch selected Pittsburgh plate glass is set in channel rubber, the frame being of 1 by 1/2-inch steel tubing with 3/8 by 3/8-inch groove, finished in three coats of black enamel, baked on. The hinges are of the friction type, a slight turn of the wing nuts adjusting the upper fold to any angle desired for rain vision or ventilation. These shields are claimed to be practically indestructible and guaranteed not to rattle. They are supplied with or without the filler board in sizes ranging from 25 to 32 inches high and 40 1/2 inches wide. [Banker Wind Shield Co., Pittsburgh, Pennsylvania.]



RUBBER MILK SPONGES.

The "rubber-milk" sponge, now being marketed in London under the trade name "Quala," is claimed to be a very different article from the rubber sponges of Continental European and American manufacture, which have from time to time appeared on the market. The "Quala" is made by a wet process direct from the "rubber milk" or latex. It resembles the natural sponge in appearance, and unlike the red rubber sponges, it swells and grows soft in water. Over the natural sponge it is said to have the advantage that it does not clog nor get foul with soap. This "rubber-milk" sponge is to be extensively advertised, and instructions furnished with each sponge advise purchasers before putting the sponge into use, to soak it in hot water for half an hour and then soap it thoroughly and rinse. This treatment restores the "Quala" to its natural color and normal size, which is about one-half larger than in its dry, packed state. The sponge should afterwards be kept moist and should not be exposed to sunlight for any length of time. This "rubber-milk" sponge is made at Brentford, England. [Rubber Sponges, Limited, London, England.]

LIFE PRESERVER FOR ADULT AND CHILD.



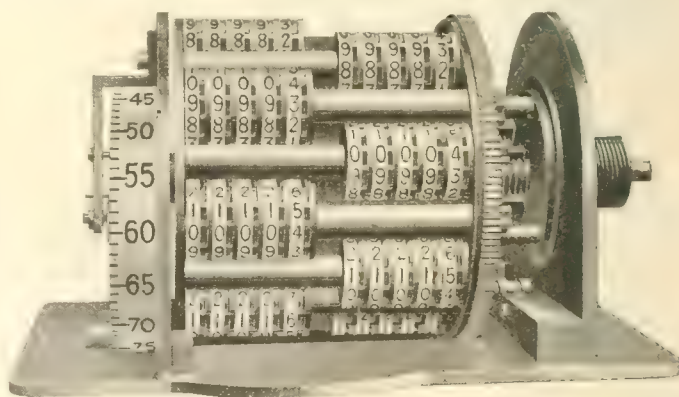
The inventor's hand will be seen on the boy's shoulder in the accompanying illustration of a life preserver large enough to admit an adult and child. The boat-shaped frame is covered with waterproof material which is extended in the proper places for the arms and legs. The life preserver is further provided with cork floats, a window for light and observation, and air intake tubes. When closed, it locks and the wearer floats on his back, riding the waves and completely protected from cold and water. [Nick K. Ramos, Lansing, Michigan.]

pletely protected from cold and water. [Nick K. Ramos, Lansing, Michigan.]

THE HAMILTON MULTOMETER.

A recording device that accurately indicates the separate mileage of each tire in service and also of the two spare tires is one of the newest accessories to claim the motorist's attention. Moreover, in case of puncture, blowout, or tire replacement, the registering device may be disconnected and the mileage of that particular tire recorded.

It is a speed indicator as well, and indicates trip or season mileage. It also records gasoline mileage (for the season or trip) with mathematical accuracy, and indicates the necessary me-



chanical adjustments, oiling and cleaning requirements, at each 500 and 1,000-mile period.

The Multometer is an accurate instrument and is said to record 13 separate readings that contribute to the economical and efficient operation of the car.

It is operated from a single flexible shaft and mounted in a manner similar to the standard speedometer equipment. The control is exceedingly simple:

Turn the movable dial ring indicated in the illustration so that the reading desired shows on the face of the ring directly opposite the setting knob at the right. Turning the dial ring to the point marked "trip" indication shows mile by mile on the dial. Turn it to the point marked "total" and the total mileage for the season shows up instantly. Turn it to the point indicating any tire on which you desire reading and you get the totals immediately. [The Hamilton Corporation, Lancaster, Pennsylvania.]

The Editor's Book Table.

EXPORT TRADE DIRECTORY. BY B. OLNEY HOUGH. JOHNSTON Export Publishing Co., New York City. [540 pages, cloth, \$5.]

THIS important trade directory comes to us much enlarged over the previous number, containing as it does a gain of more than 50 per cent in many of its principal lists. Export merchants in New York are given to the number of 1,295 in place of less than 800 in the last edition and the San Francisco list shows a gain of more than 20 per cent. The book gives lists of the principal export merchants of the United States, export agents and brokers, the leading bankers engaged in foreign exchange business, marine insurance companies, foreign freight forwarders, the steamship service to foreign ports, consuls of foreign countries in the United States and our consuls in foreign countries, associations for promoting export trade, and several classified lists for quick reference as to goods manufactured or markets cultivated. The book is compiled by B. Olney Hough, editor of the "American Exporter."

COMMERCIAL WOODS OF THE PHILIPPINES: THEIR PREPARATION and Uses. By E. E. Schneider, Bureau of Forestry, Manila, Philippine Islands. [8vo, 274 pages, paper covers, \$1.00.]

This work is intended primarily to furnish woodworkers and users with authentic information concerning the woods of our island possessions in the Far East. There is a concise account of the forests, with a description of each species of wood, its physical and mechanical properties, and the different purposes for which it can be utilized. Quite full and untechnical directions are given for the identification of the trees, and of the wood when cut into lumber. More than half the book is devoted to detailed descriptions of the 360 Philippine woods, with notes on their mechanical properties and workability. Each is given its botanical, and its local name or names, its uses, and approximate prices. It is a book of practical use to those interested in the building and wood-working trades.

THE INDUSTRIAL AND SOCIAL IMPORTANCE OF FORESTRY IN China. By Forsythe Sherfese, Ministry of Agriculture and Commerce, Peking, China. [Small 8vo, 26 pages.]

Forsythe Sherfese, Adviser in Forestry to the Agricultural Department of the Chinese Republic, claims in this paper, which is reprinted from "The Chinese Social and Political Review," that the chief handicap in China's industrial advance is the lack of forests, and consequent scarcity of wood for building, manufacturing purposes and fuel. No other modern country has been so denuded of forests, through heavy rainfalls washing away the soil, and he predicts a condition similar to the Sahara, unless forests are planted. Millions of acres of public lands, unsuited to agriculture but fully capable of supporting forest growth, lie idle and unproductive. To overcome this state of affairs, there was created last year the first Chinese National Forest Service, and this body is inaugurating a comprehensive plan for reforestation in many sections of the country.

FATIGUE STUDY. BY FRANK B. AND LILLIAN M. GILBRETH. Sturgis & Walton Co., New York City. [Small 8vo, 159 pages, illustrated. Price, \$1.50.]

The twentieth century manufacturer aims to find the best workers, and to secure from them their best work. To accomplish the latter is the object of the study which is here described. Every worker, whatever his task, can do better work, and labor effectively for a longer time, if conditions are such that no unnecessary fatigue is induced. This book is devoted to such study. It contains a large amount of practical matter, the result of scientific investigation of two experts, with many definite suggestions and reports of plans which have been worked out in the investigation for eliminating unnecessary fatigue. The book contains a large number of illustrations from photographs taken at the plant

of the New England Butt Co., where these studies have been put to practical use and the results have proven their value. Especially interesting are some of the studies of false motion, where a small electric light has been placed upon the hand and then a photograph made, tracing the motions of the hand as recorded on the photographic plate. These cyclegraphs and chronographs are worthy of special study. Many other special inventions which have been made by the authors and put to practical use are pictorially recorded, as well as some motion pictures taken each five-hundredth of a minute for the purpose of studying a means of eradicating false motions and fatigue. This book aims to present the problem of fatigue in the industries in its simplest form, and to outline its practical solution.

MOTOR TRUCKS OF AMERICA. VOL. 5. THE B. F. GOODRICH Co., Akron, Ohio. [164 pages, paper covers.]

The truck tire department of The B. F. Goodrich Co., Akron, Ohio, has issued Volume 5 of its excellent work giving full details and specifications of the motor trucks manufactured in this country. Each truck is pictured in an excellent half-tone, and the various specifications as to model, capacity, price, the dimensions of the motor, the wheelbase, and the tires, as well as every other item regarding external and internal construction. More than 120 different trucks are thus fully described. There is also a finely illustrated article entitled "Lengthening the Life of the Motor Truck" and other information of value to every owner, user and repairer of such vehicles. At the end of the book are bound in, four printed and directed postcards which may be detached and sent, requesting further publications of that company.

NEW TRADE PUBLICATIONS.

THE DAVOL RUBBER CO., Providence, Rhode Island, is distributing a very neat little catalog and price-list of fountain syringes, water bottles and similar goods, handsomely printed, with the various lines pictured in the vivid colors of the goods themselves, the illustrations occupying the right-hand pages, the description and prices on the pages opposite. It is at once compact and comprehensive, and should bring business.

* * *

The Thermoid Rubber Co., Trenton, New Jersey, sends us a finely printed catalog of its automobile products, including tires, inner tubes, brake linings of various types, clutch facings and disks, fan belts, bumpers, pedal pads, pump tubing, and various styles and qualities of hose, besides miscellaneous accessories for automobiles. Half-tone illustrations are profusely scattered through the book, giving excellent ideas of the goods listed. A bird's-eye view of the plant decorates the title page.

* * *

"Science Progress," the well-known English quarterly, (John Murray, Albermarle street, London) has sent this office the July 16, 1916, number, which contains an able and interesting "Historical Sketch of the Chemistry of Rubber," by S. C. Bradford, B.Sc., of the Science Museum, South Kensington, London. In less than a dozen octavo pages, Professor Bradford has collected a host of facts, historical and chemical, including those regarding the successful production of synthetic rubber, reviewing succinctly the experiments and researches from Hancock, in the early '40s, to Matthews and Bayer during the present decade.

* * *

The Fisher Governor Co., Marshalltown, Iowa, sends out a fine line of "bulletins" which are arranged to form, in the self binder furnished, a full catalog of the pump governors, reducing valves, exhaust and relief valves, pressure regulating devices, steam traps and similar mechanisms for use in indus-

trial establishments. These bulletins are finely printed, illustrated with simple diagrams and excellent half-tones, and the descriptive matter clear and concise. In the list of large users of the Fisher specialties are a number of leading rubber manufacturing concerns whose names are familiar to our readers.

* * *

William H. Scheel, 159 Maiden Lane, New York City, importer and distributor of rubber substitutes, rubber workers' supplies, compounding ingredients for rubber and other trades, has issued a buyer's list covering his complete line. Purchasing agents will be supplied with as many copies as they require.

* * *

The Apsley Rubber Co., Hudson, Massachusetts, is sending out a style book which within its 80 pages shows well-executed half-tones of practically every rubber this company manufactures. The footwear which is other than black is printed in its appropriate color. Besides the side views, the shapes of the soles are given and the description of each shows its special features. The cover is printed in blue and gold and, typographically, the pamphlet is most commendable.

Distributed with this is a smaller pamphlet giving the packing schedule, which shows the number of pairs of each size in 12 and 24-pair cases.

THE WORLD'S RUBBER POSITION.

The annual chart showing in graphic form the World's Rubber Position as published by W. H. Rickinson & Son, London, shows in diagram many important facts regarding rubber production, prices and distribution. The wonderful advance in the total production, and the increased yield of plantation rubber and the average prices show the most sensational lines on the chart, but the other diagrams are also interesting. The statistics of plantation rubber are given in columns at the right and left of the chart. They show number of acres in bearing, yield in tons and price per pound. The great expansion of American consumption of rubber, and comparatively small increase in the retention of rubber in Great Britain are especially worthy of attention. In all, the chart is well worth a place in every rubber merchant's and manufacturer's office. This chart is reproduced in greatly reduced form on another page in this issue.

CALENDARS AND SOUVENIRS.

Although the first of the year is the usual time for the distribution of calendars and other souvenirs for advertising purposes, THE INDIA RUBBER WORLD has received quite a number during last month, which are hereby acknowledged.

The Industrial Chemical Co., New York City, has sent out a very useful little affair which combines an 8-inch rule, a calendar for the year and a signature blotter. This is in enameled white metal with several layers of blotting paper on the under side, while the announcement of the company occupies a space between the two groups of six months each giving the calendar for the year.

Those smokers will be delighted who receive from Katzenbach & Bullock Co., New York City, a combined match box, cigar rest and ash tray of bronze finish with a holder of the proper size to contain a box of matches. The latter has upon either side an advertisement of the lines of goods carried by this well-known chemical firm.

One of the most striking calendars received is that of the Buffalo Foundry & Machine Co., Buffalo, New York, which is in the form of a handsome reproduction of Thomas Moran's celebrated painting, "Venice the Golden." The brilliant coloring of this picture and its fine reproduction make it an ornament worthy to adorn any office or home.

For practical advertising F. E. Myers & Bro., Ashland, Ohio, must be commended. Their calendar sheet contains engravings of several hundred varieties of pumps and miscellaneous ma-

chinery in which this firm specializes. The calendar is small and neat and occupies the center of the sheet. At the top is a colored lithograph of a country scene, perhaps a Jack and Jill, the latter using a Myers pump most effectively.

The Firestone Tire & Rubber Co., Akron, Ohio, embellishes its new calendar with a ten-color print of a handsome girl of the American type. The original, the work of Earl Christy, is owned by the Firestone company. The reproduction is a fine example of art printing.

Obalsky & Sweeney, Inc., crude rubber importer, New York City, has distributed to the trade a useful and ornamental souvenir. It is a red leather desk pad of convenient shape for recording memoranda, the paper being supplied from a removable roll enclosed in the top of the pad.

RUBBER TRADE INQUIRIES.

THE inquiries that follow have already been answered; nevertheless they are of interest, not only in showing the needs of the trade, but because of the possibility that additional information may be furnished by those who read them. The editor is therefore glad to have those interested communicate with him.

[274.] A correspondent wishes to obtain a small skiving machine for use in making patches.

[275.] Manufacturers of small laboratory roller mills for working up samples of rubber are sought.

[276.] Names and addresses of concerns supplying rubber seed oil have been requested.

[277.] An inquiry has been received for machinery used in the manufacture of tires and inner tubes for automobiles, motorcycles and bicycles.

[278.] A correspondent is interested in the machinery used in repairing tires and in making rubber heels and tennis balls.

[279.] Information is desired regarding zinc substitutes.

[280.] An inquiry has been received for rubber respirators.

[281.] Names of makers of machinery to cut sheet rubber into threads for elastic textiles have been requested.

[282.] Names of manufacturers of rubber pencil tips are desired.

[283.] Full information regarding tire vulcanizing is requested.

[284.] An inquiry has been received for brass hot water bottle stoppers.

[285.] A machine for cutting rubber thread is sought.

TRADE OPPORTUNITIES FROM CONSULAR REPORTS.

A firm in Bolivia wishes to be put in touch with American manufacturers and exporters of cheap rubber hair ornaments. Report No. 23,627.

Exclusive agency for the sale of tires is desired by an engineer in Switzerland. Report No. 23,656.

A firm in Bolivia wishes to receive catalogs and full information from American manufacturers and exporters of rubber combs. Report No. 23,659.

Representation of American manufacturers and exporters of pneumatic tires is desired by an applicant in Spain. Report No. 23,666.

Agency is desired in Australia for the sale of elastic fittings for suspenders, etc. Report No. 23,682.

A man in Switzerland desires to purchase erasers and to secure an agency for their sale. Report No. 23,684.

A firm in British East Africa is in the market for canvas and leather shoes with composition and chrome soles. Report No. 23,699.

An applicant in Spain desires to purchase pneumatic tires and automobile supplies. Report No. 23,729.

An Australian business man now in the United States wishes to purchase balata belting. Report No. 23,750.

The Obituary Record.

RICHARD S. SATTERLEE, vice-president of the Habirshaw Electric Cable Co., Inc., of New York City, died at his home in that city February 15, aged 56 years.

Captain Satterlee was born in New York City, June 6, 1860, son of the late George B. and Sarah Satterlee. He was

educated at St. Paul's School in Concord, New Hampshire, and at Holbrook's Military Academy, Ossining, New York, afterwards studying at the College of Physicians and Surgeons, New York City, where, however, he did not complete his course. He served in the Seventh Regiment, New York National Guards, and for several years was engaged in cattle raising on a ranch in Wyoming. After his return to New York City he entered the real estate busi-



CAPT. R. S. SATTERLEE.

ness and was appointed Deputy Tax Commissioner by Mayor Strong, serving four years.

He went around the Horn in a sailing vessel in 1898 and on arriving in San Francisco, California, he heard of the declaration of war with Spain and immediately joined the First New York Volunteers and started for the Philippines. Typhoid fever broke out and the regiment got no further than Honolulu. Later he received a commission as First Lieutenant in the Twelfth New York Infantry, and saw service with this regiment in Cuba. After the Spanish war he became connected with the Habirshaw Wire Co., in which his brother, Hon. Herbert L. Satterlee, was interested. He was president of the company at the time it became associated with the Electric Cable Co., and the name was changed to the Habirshaw Electric Cable Co., Inc., Mr. Satterlee becoming vice-president, a position he retained up to the time of his death.

At the time when it seemed probable that this country would have war with Mexico, Mr. Satterlee offered his services to the State, although he was past military age, and his offer being accepted, he was appointed Captain of Ordnance and attached to the Division Staff.

On the 10th of last month, in company with Major L. Reagan, Division Adjutant, Captain Satterlee began a tour of inspection of the aqueduct at points where guards had been stationed. The long exposure to severe weather caused a sudden illness, which resulted in his death.

Captain Satterlee is survived by his widow, his mother, a sister and a brother.

A WELL-KNOWN RUBBER RECLAIMER.

Samuel Wright, prominently connected with the crude and reclaimed rubber business, died of pneumonia January 18 at his home in Yonkers, New York.

He was born in Conshohocken, Pennsylvania, June 22, 1875,

and after graduation from the Academy of Natural Sciences, Philadelphia, became assistant secretary of the J. Elwood Lee Co., Conshohocken, and in 1911, when the Lee Tire & Rubber Co. was formed, was appointed secretary, resigning about a year ago to become associated with the Philadelphia Rubber Works Co. He was also treasurer and general manager of the Acushnet Process Co., Inc., of New York City, a corporation formed to handle the New York City business of the Acushnet Process Co., of New Bedford, Massachusetts.

Mr. Wright was a thirty-second degree Mason, a Shriner, and a member of the Loyal Legion, the Rubber Association of America, and the Merion Cricket Club of Philadelphia.

HEAD OF THE GERMAN RUBBER MANUFACTURERS.

The death is announced of Louis Hoff, chairman of the Central-Verein Deutscher Kautschuk-Waren Fabriken (German Rubber Manufacturers' Association) since 1904, and general director of the United Harburg-Vienna India Rubber Works. He was also prominently associated with the Kolonial-Wirtschaftlichen Komitee.

LONG PROMINENT IN CRUDE RUBBER TRADE.

Herman Reimers, well known in the crude rubber trade, died at his home, "The Elms," Spaniards' Road, Hampstead Heath, London, England, February 11, in his sixtieth year.



H. REIMERS.

Mr. Reimers was born in Bremen, Germany, and when a young man came to this country in 1876 and was connected with the crude rubber house of Charles Loewenthal & Co., later becoming a member of the firm. He represented the company in Boston, Massachusetts, for several years and when the partnership expired by limitation, December 31, 1891, a new partnership of Reimers & Meyer was formed, afterwards becoming Reimers & Co. In

1902 this firm was succeeded by Poel & Arnold. Mr. Reimers remained out of business for about six years, during which time he made his home at Honnef, Germany, but traveled extensively in Europe, and then he became a partner in the parent house of Heilburt, Symons & Co., London, England, where he remained until the time of his death. He was at one time chairman of the board of the Anglo-French Mercantile and Finance Corporation, Limited, a £1,000,000 corporation for financing, buying and selling rubber plantations, and was director in several rubber plantation companies in the Far East.

Mr. Reimers was of strong personality, a man of exuberant spirits and tremendous vitality. It is said that he had several times been mistaken for Sandow, the wrestler, both on account of his physical build and facial resemblance. He visited the

Amazon rubber regions in 1894, where he tapped trees, gathered latex and smoked the rubber, and he wrote an entertaining account of this which appeared in THE INDIA RUBBER WORLD, June 15, 1894. He had a large acquaintance and a host of friends in the rubber trade, not only in this country but in Europe.

A LEADING RUBBER GOODS DISTRIBUTER

Warren M. Salisbury, one of the original incorporators of W. H. Salisbury & Co., the well-known rubber distributing concern, Chicago, Illinois, and its first president, died at the Presbyterian Hospital in that city February 5 at the age of 58. The business dates from 1855, and was named for his father, W. H. Salisbury, who was its active head from 1874 until his death in 1902. The business was incorporated in 1904, and is one of the leading houses in the west for the distribution of mechanical rubber goods and leather belting.

Warren M. Salisbury was born in Augusta, Georgia, and came to Chicago in 1877. His entire business life was spent with the above named company, but he was also a director in the W. W. Kimball Piano Co. and the Rockwood Sprinkler Co. of Chicago. He is survived by his widow, and one son, Kimball M. Salisbury.

PROMINENT IN THE TIRE FABRIC INDUSTRY.

William B. Fittz, formerly general manager and secretary of the Connecticut Mills Co., Danielson, Connecticut, died at Brookline, Massachusetts, February 12, aged nearly 61 years.

Mr. Fittz was identified with the textile industry during his entire business life. He was superintendent of the West Boylston Manufacturing Co. at Oakdale, Massachusetts, and it was under his supervision that the entire plant was transferred to Easthampton, Massachusetts, in record time. In October, 1911, he started the Connecticut Mills Co. enterprise at Danielson to manufacture tire fabric. Under his management, the little six-loom mill grew to its present proportions. Meanwhile, he established the Canadian Connecticut Cotton Mills, Limited, at Sherbrooke, Quebec, to supply the Canadian demand for the company's product. Mr. Fittz resigned as secretary and general manager in October, 1914, and devoted his time to travel.

His first wife died seven years ago. He married, in June, 1916, Miss Bertha Field, who survives him. The wedding trip was to Japan and other countries of the Orient. Returning to America last October, he resided in Brookline, Massachusetts.

A FORMER RUBBER STAMP MANUFACTURER.

James K. Stewart, for many years a prominent manufacturer of rubber stamps in Cincinnati, Ohio, died suddenly at his home in that city on January 26. He was an active and energetic member of the International Stamp Manufacturers' Association, and was a member of its board of directors. Through his efforts the Cincinnati Stamp Club was formed, and he was elected president, which position he resigned when he withdrew from the stamp business. He was engaged in the stationery trade at the time of his death.

FIRESTONE SALES MANAGER.

F. C. Blanchard, sales manager to motor car makers, of the Firestone Tire & Rubber Co., Akron, Ohio, died at the City Hospital there February 12, following an operation. Mr. Blanchard was born in Akron and his business career began with the Whitman & Barnes Manufacturing Co. at the age of 17. Developing rapidly, he became an efficient salesman and about six years ago joined the Firestone organization as assistant sales manager, to take special charge of the sales to manufacturers, and for one year, during the absence of R. J. Firestone, he acted as general sales manager.

Mr. Blanchard had a wide acquaintance among the automobile manufacturers throughout the country and was very popular, having hundreds of friends in the industry. He was a member of the Portage Country Club, the Akron City Club and the Rotary Club. He leaves a widow and two children.

JUDICIAL DECISIONS.

CATARACT RUBBER CO., EMERSON ET AL. V. CASTOR ET AL. In the matter of the bankruptcy of the Cataract Rubber Co., which maintains and operates a plant for the manufacture of rubber tires at Wooster, Ohio, Robert S. Emerson, as trustee in bankruptcy and receiver of the bankrupt and another, instituted proceedings for the recovery of property against which Charles A. Castor and others asserted liens and priorities, and appealed from a decree upholding the liens. The decree was reversed and remanded, with directions for modification. [The Federal Reporter, Vol. 236, page 31.]

SLAMA TIRE PROTECTOR CO. V. RITCHIE ET AL. The action by the company against J. A. Ritchie and another, partners as Ritchie & Heriot, was for breach of contract. The plaintiff's appeal from an adverse judgment was affirmed. [The Pacific Reporter, Vol. 161, page 25.]

THERMOID RUBBER CO. V. BRICHTSON. In an action of the Thermo-oid Rubber Company against O. A. Brichtson, trading under the name of the Brichtson Manufacturing Co., the plaintiff appealed from an order overruling the demurrer to the defendant's counter claim. The appeal was perfected July 7, 1916. No briefs had been filed in the Supreme Court of South Dakota, nor had any stipulation been filed, extending the time for such filing. The appeals were therefore deemed abandoned, and the order appealed from was affirmed. [The Northern Reporter, Vol. 159, page 872.]

UNITED STATES RUBBER CO. V. BERNARD SILVERSTEIN. The action was brought to recover a guaranty for the payment of goods sold to the defendant's sons which the court pronounced ambiguous, being based upon grammatical errors. The motion for a new trial was denied. [The New York Supplement, Vol. 161, No. 3, page 369.]

DAYLIGHT SAVING.

THE movement to turn all clocks in the country one hour ahead of the present standard time during the summer months has taken on great impetus as a result of the recent National Daylight Saving Convention in New York City and President Wilson's endorsement of the plan. The matter was also under consideration at the fifth annual meeting of the Chamber of Commerce of the United States at Washington, District of Columbia, a special committee having recommended congressional action to authorize the change throughout the year. While the directors agree that the plan should be adopted during the summer months, they are not prepared to advocate its adoption for the whole year, and the matter will probably be referred to the membership through a mail referendum.

American manufacturers of rubber as well as other goods are fully alive to the manifest physiological, economic and social advantages of the daylight saving plan, as demonstrated last summer in Germany, Austria, France, Italy, Portugal, Holland, Denmark, Norway and Sweden, where clocks were uniformly turned forward. Progressive men among them believe the project offers a measure of relief particularly desirable during the present feverish activity in most factories of the country. No argument is needed to the effect that a cool morning working hour, instead of a hot one in the afternoon, together with increased daylight during the hours of greatest fatigue, will increase opportunities for beneficial recreation with consequent greater personal efficiency, will reduce industrial accidents, lessen the tuberculosis tendency and reduce eye strain. The advantages of having the transportation "rush" hour occur before nightfall are apparent, and the total direct savings in fuel for artificial light would be tremendous.

Interesting Letters from Our Readers.

RUBBER RECLAIMING BECOMING A GREAT INDUSTRY.

TO THE EDITOR OF THE INDIA RUBBER WORLD:

DEAR SIR—It does the heart of a practical rubber technologist to note that leading rubber manufacturers are at last manifesting active interest in the proposition to provide within our own borders the raw materials essential to the rubber

industry. Recently we have heard much about preparedness, and the international situation today emphasizes the reasons for it as never before. In our own line, substantial progress has been made in Imperial Valley, California, toward providing the long-staple cotton necessary for tire fabrics. It has been demonstrated that we can, if need be, maintain that industry without cotton imports. But America in the future must be prepared to produce its own rubber.

Heretofore commerce has followed the flag. In the case of rubber production the flag must follow the plow. Our land-grant colleges should offer special instruction in tropical agriculture and make rubber culture a requirement. The Americas have the soil as well as the conditions, and though handicapped by the cheap labor of the Orient, American methods, aided by American machinery, will be successful.

J. C. Harvey, that pioneer in rubber culture, who gathered from the many corners of the earth the various kinds of rubber-bearing plants and grew and studied them on his Mexican *hacienda*, had in his collection the *Hevea*. Specimens of this tree planted and grown under poor conditions had made, a few years ago, as good an appearance as many of the Malayan representatives did in their early life. Had these trees been given the benefit of cultivation and time, what might have been the result? Harvey's work, while left unfinished, was not lost. Who will take up the thread?

Another matter not entirely devoid of interest is the possibility, though remote, of the production of crude rubber in the Temperate Zone. The milkweed idea is not wholly deceased, and during 1917 a small-scale experiment to determine the exact economic value of the *Asclepias* in the production of rubber, fiber and oil (from seed) will be tried out in the fertile soil of the Big Miami Valley where the plant reaches its maximum growth. During the past season Willis Knickerbocker, New Lenox, Illinois, has experimented with the fruit of the Osage orange. He has tried waterproofing cloth with Osage "orangeade" and I have seen worse results. In Arizona the ocotillo (*Fouquieria splendens*) is being extracted for the wax, which is said to be a good substitute for chewing-gum. This plant under suitable treatment should yield another product valuable as a compounding ingredient.

A local rubber concern has acquired land in Salt River Valley, Arizona, and will grow its own supply of cotton there. In connection with this enterprise the conditions are ideal to test the Lloyd system of growing guayule. The rabbit-weed or pingue (*Picradenia floribunda*) would probably give even better results.

Writing about fibers for auto tires leads to the suggestion of the use of some of our uncommon native fibers. Many years ago, the East Indian *Abutilon* was introduced into the United States, and has now become a troublesome weed throughout the Central States. The plant produces a strong fiber. Our moraceous wild Indian hemp (*Cannabis sativa*) produces a good fiber as well as rubber. In the Pecos district of western Texas thousands of acres are overgrown with the Spanish bayonet. This plant has an excellent fiber in its leaf and a valuable glucoside in its root.

Altogether there are still several lines of considerable promise worthy of investigation and experiment at the hands of progressive, forehanded rubber manufacturers.

C. P. F.

Cleveland, Ohio, January 30, 1917.

GROWING RAW MATERIALS IN THE AMERICAS.

TO THE EDITOR OF THE INDIA RUBBER WORLD:

DEAR SIR—It does the heart of a practical rubber technologist good to note that leading rubber manufacturers are at last manifesting active interest in the proposition to provide within our own borders the raw materials essential to the rubber

Akron, Ohio, February 15, 1917.

"Rubber Machinery," Mr. Pearson's newest book, filled with valuable information for rubber manufacturers, is now ready for mailing. Price, \$6.

PROGRESSIVE.

Housing the Connecticut Mills Employes

By J. J. Howard, Architect.

ANYBODY who has seen a typical cotton mill town with its unsightly rows of barn-like tenements will be pleasantly surprised by a visit to Danielson, Connecticut. Opposite the growing plant of the Connecticut Mills Co., weaver of tire fabrics, in a rolling tract of land 150 acres in extent and containing a picturesque little pond, is springing up a model village of comfortable, attractive cottages for the operatives. Winding streets are being laid out, landscape features determined, and when the development is complete, extensive lawns, shade trees, flower and vegetable gardens will complete the picture and combine all the benefits of country living with such conveniences of the city as electric lights and sanitary plumbing.

The housing movement was slow to reach cotton operatives because of the long established conviction that crowded tenements sufficed. But R. J. Caldwell, of New York City, thought differently, and the work now under way around the mills at Danielson, and at Sherbrooke, Quebec, as well as that contemplated at Taunton, Massachusetts, has acted as an incentive to others who are falling in line. Mr. Caldwell believed that because cotton operatives had always been obliged to hive together was no reason to suppose they did not long for modern conveniences. Moreover, the result of his experiment has proved that they do desire and appreciate better conditions, will not intentionally abuse them, are amenable to suggestions for a higher standard of living, and that greater efficiency and permanency of employment are the results.

Mill officials and citizens of Danielson financed the project by organizing the Danielson Construction Co. and subscribing a working capital of \$40,000. The houses are erected by local builders, rented by the mill for a period of three years at 10 per cent of their cost, and then sub-let to employes and the rental of about \$4 weekly deducted from the pay envelope of the tenant. Ordinarily this rental is easily within the reach of cotton mill operatives, who are now receiving the highest wages in the history of the industry. Moreover, there are often several wage earners in a family. In special instances, however,

when for some adequate reason the amount is more than a deserving employe can afford to pay, the mill will assume part of the annual rental up to \$25.

Many operatives wish to own their own homes, and to encourage this tendency toward permanence and better citizenship, N. D. Prince, vice-president of the Windham County National Bank, rose to the occasion and arranged not only to have his bank lend any reasonable sum to the construction company, but to assist individual financing as well. Thus the bank takes a 70 per cent first mortgage provided the operative can furnish the other 30 per cent himself. When a deserving person cannot do this, yet desires to buy a home, the mill advances it on a second mortgage, deducting the amount proportionately from the tenant's pay envelope until the second mortgage is disposed of, and continuing thereafter to make such equitable deductions as circumstances permit for the payment of the first mortgage.

Several four-family houses were put up at the outset as receiving stations for new help as recruited, but later operations have been principally in single houses with a few of the two-family semi-detached type, most of them intended for sale to operatives. Each single house is about 25 feet square with four rooms of ample size on each floor, a good porch, attic and cellar. A bathroom with open plumbing, hot and cold water in the kitchen

and bathroom, and electric lights throughout are the principal features, however. Floors and wood trim are of Georgian pine with inside walls of rough plaster oil-painted in warm tints, which is more sanitary than wall paper and more easily repaired.

William H. Cox, the architect, has provided several floor plans, to which various exteriors can be applied. Only four or five similar houses will be erected, and these are to be so scattered over the entire development and so varied by the use of shingles, clapboards, siding or stucco for the exterior walls, as to avoid any appearance of duplication. Thus far all have been of wood in the Colonial spirit, but several of the English cottage type are soon to be erected. The cost is about \$1,900 each, or \$3,600 for the two-family houses.



A PLEASING TWO-FAMILY HOUSE FOR THE CONNECTICUT MILLS CO.



PICTURESQUE TYPES OF SINGLE HOUSES AT DANIELSON, CONNECTICUT; A GAMBREL-ROOF LEAN-TO AND A CAPE COD FARMHOUSE.

News of the American Rubber Trade.

THE FISK RUBBER CO. CONFERENCE.

A FOUR-DAY conference of district and branch managers of The Fisk Rubber Co., Chicopee Falls, Massachusetts, held during the past month, was not only the first gathering of all the executive heads of this company, but also in the nature of a dedication of the enlarged model industrial plant which houses the manufacturing and administrative departments.

Vice-President E. H. Broadwell welcomed the delegates at the factory, and during the session addresses were made by the following department heads: F. H. Ayers, sales manager; J. D. Anderson, factory manager; E. M. Bogardus, comptroller; George L. Sullivan, advertising manager; Charles H. Gage, of the sales department; Leon H. Southmayd, in charge of the bicycle tires and tire sundries department; George B. Hendrick, publicity manager; W. B. Keiser, credit manager; R. B. McGaw, assistant treasurer; W. H. Bogardus,

per cent on common stock was declared payable March 31 to stockholders of record March 15.

NEW YORK RUBBER CO.

At a stockholders' meeting of the New York Rubber Co., New York City, held on January 30, the following trustees were elected for the ensuing year: John Acken, Rufus A. Brown, William H. L. Lee, E. S. Woodward, Henry Montgomery, H. F. Hering and George Langdon. At a meeting of the trustees on the same date, officers were reelected as follows: John Acken, president and treasurer; Henry Montgomery, vice-president and secretary; H. F. Hering, second vice-president.

H. MUEHLSTEIN & CO.'S NEW PLANT.

The general offices of H. Muehlstein & Co., scrap rubber merchants, have been removed from Washington and Hubert streets



H. MUEHLSTEIN & CO.'S PLANT, NEW YORK CITY.

manager of the branch auditing department; C. I. Bradley, manager of the service department; William J. Lambe, Detroit district manager, and John B. Maus, export manager.

Meetings were held at the plant, but the visitors' headquarters were at the Hotel Kimball, Springfield, Massachusetts, where a banquet concluded the conference.

PENNSYLVANIA RUBBER CO. MEETING.

At the annual meeting of the stockholders of the Pennsylvania Rubber Co., Inc., held at Jeannette, Pennsylvania, Monday, February 19, the following directors and officers were elected for the ensuing year: Herbert DuPuy, chairman; H. Wilfred DuPuy, president-treasurer; Chas. M. DuPuy, vice-president; Seneca G. Lewis, general manager; Geo. W. Shiveley, secretary; Chas. G. Morrill, assistant treasurer.

The five first named and G. A. McLaughlin compose the directorate.

A quarterly dividend of 1¼ per cent on preferred and 1½

to Third avenue, at One Hundred and Thirty-third street and the Harlem River, where they have a large and finely equipped establishment devoted exclusively to scrap rubber and rubber waste. The plant consists of three connecting buildings, each five stories and basement, with an aggregate floor space of 100,000 square feet, in addition to considerable yard space, and the property affords exceptional rail and water shipping facilities. Included in the special equipment provided for operating the plant are three large elevators, 10 Minnich steel presses and several 7-ton Hurlburt motor trucks.

BOSTON BANK ESTABLISHES ARGENTINE BRANCH.

The First National Bank of Boston will shortly open a branch at Buenos Aires, under the managership of Noel F. Tribe, a banker of experience who has resided in Argentina for over 20 years. This extension of the bank's activities will be appreciated by merchants and manufacturers interested in trade with this prosperous South American republic.

TRADE NOTES.

The Newport Chemical Works, Inc., New York City, now occupies new offices at 120 Broadway, suite 1605-1606.

At the annual meeting of the Chicago Rubber Clothing Co., Racine, Wisconsin, the capital stock was increased from \$175,000 to \$350,000, and the following board of directors elected: Walter C. Palmer, George G. Bryant, A. E. Boyeson, James Murphy, E. L. Haynes, Martin Hueffner, Edward L. Baker. The board then organized by electing the following officers: Walter C. Palmer, president; James Murphy, vice-president; George G. Bryant, secretary and general manager; Martin M. Hueffner, treasurer.

Gutta Percha & Rubber, Limited, Toronto, Canada, has donated \$5,000 to endow a bed in the Toronto General Hospital for its former president, the late Captain Trumbell Warren, 15th Toronto Highland Battalion, who fell in action on April 20, 1915.

The Farrel Foundry & Machine Co. announces the removal of its Cleveland, Ohio, office on March 1 to 810 Union National Bank Building.

The City Council of Niagara Falls, New York, recently purchased 1,000 feet of fire hose from the Manhattan Rubber Manufacturing Co., of Passaic, New Jersey, and the Bi-Lateral Fire Hose Co., of Chicago, Illinois.

The recently organized India Rubber Co., located at Mogadore, Ohio, has purchased 13 acres of land near the railroad. The company is capitalized for \$125,000 and proposes to spend \$100,000 in the erection and equipment of the plant. The principal stockholders are J. M. Alderfer, R. M. Pillmore and J. K. Williams. The executive office will be in Akron, Ohio.

The Acorn Insulated Wire Co., Inc., Brooklyn, New York, has increased its capital stock from \$25,000 to \$60,000, in order to finance the installation of machinery in a new unit of its plant, and also to cover the cost of considerable raw material purchased to guard possible shortage caused by diplomatic complications.

The Standard Underground Cable Co., Perth Amboy, New Jersey, is building a 25 by 75 foot four-story and basement extension to one of the wings of its rubber factory.

The Flawless Rubber Co., of New Castle, Pennsylvania, a year-old corporation, said to be making goods of various descriptions, recently elected George H. Wind, president; John Burns, vice-president; Paul Hartmann, treasurer, and Joseph Ganster, secretary.

The Bunker Hill Rubber Works, Bunker Hill, Illinois, has opened its factory and commenced the manufacture of mechanical rubber goods.

Thomas A. Murray, formerly police commissioner of New Haven, Connecticut, and later connected with the Seamless Rubber Co., of that city, has been elected president and general manager of the National Rubber Co., Pottstown, Ohio.

The Federal Rubber Manufacturing Co., Cudahy, Wisconsin, has recently completed a \$200,000 addition to its power plant.

The Kokomo Rubber Co., Kokomo, Indiana, capitalized for \$200,000, is reported sold to a holding company for \$1,200,000.

The Oldtown Rubber Co., Xenia, Ohio, has been purchased by Robert Kuhn, of Cincinnati, Ohio. A radical change of policy is planned under the new management.

The Mineralized Rubber Co., with headquarters at Newark, New Jersey, is reported to be in the hands of a receiver. The business of the company was the manufacture of a rubber composition cap for automobile radiators. One of the petitioning creditors is Harold C. Dodge, of East Orange, New Jersey, president of the company, whose claim is for \$7,000, money advanced.

The stockholders of the Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pennsylvania, at a special meeting held recently, unanimously approved an increase in the capital stock from \$60,000,000 to \$75,000,000. The additional stock will be common and will consist of 300 shares of a par value of \$50.

RUBBER FIRMS PLEDGE GOVERNMENT SUPPORT.

RUBBER plays an important part in the national defense, and in connection with the present program of accelerated preparedness it is a sincere pleasure to record the promptness with which leading American rubber manufacturers joined other industrial and commercial establishments in pledging their hearty support to the Federal Government in any emergency that may arise. On February 3, Samuel P. Colt, president, placed the 47 factories, organization, manufacturing resources and distributing facilities of the United States Rubber Co. at the disposal of the government in case of need. The resources of this, the greatest rubber manufacturing firm in the world, are tremendous, its large plantations in Sumatra being an important national asset.

Other great rubber firms to offer their factories include The B. F. Goodrich Co., Akron, Ohio; Firestone Tire & Rubber Co., Akron, Ohio; United & Globe Rubber Manufacturing Cos., Trenton, New Jersey. More names will doubtless have been added to the list before this reaches our readers.

WESTINGHOUSE BUILDS NEW PLANT.

The site for the new plant of the Westinghouse Electric & Manufacturing Co., at Essington, near Philadelphia, Pennsylvania, embraces about 500 acres, with a frontage of approximately one mile on the Delaware River, additional transportation facilities being afforded by tracks from the Pennsylvania and Philadelphia & Reading railroads.

This new center will be devoted to the production of large apparatus, the first group of buildings being for power machinery, principally steam turbines, condensers and reduction gears. The initial development will cost in the neighborhood of \$5,000,000 or \$6,000,000, occupying about one-fifth of the area of the entire plot, the buildings consisting of two large machine shops, an erecting shop for heavy machinery, forge shop, pattern and pattern storage shop and power house.

The employees to be engaged at the new plant will number several thousand, and undoubtedly will in the future equal the number employed at the East Pittsburgh, Pennsylvania, plant of the company, representing over 20,000 people.

MAKING RUBBERS ON BROADWAY.

The public likes to know how commonly used articles are made, and recent instances indicate that there is no better window advertising than a manufacturing demonstration such as that conducted by the United States Rubber Co., 1790 Broadway, New York City. During the week of January 22 one of the handsomely decorated display windows was fitted up like the making room of a well-equipped rubber footwear factory and four operatives from the Goodyear's Metallic Rubber Shoe Co. manufactured women's croquets and storm slippers, also United States patent pressure process rubber boots in black, red and white. Large crowds showed great interest in the diaphragm machine employed to press the parts of women's rubbers into practically one piece.

NEW METHOD OF SOLING BOOTS.

The American Consul at Leeds, England, reports a patented method of manufacturing boot soles from scrap leather. It is claimed that the soles are non-suction, non-slipping, and water proof; that they can be produced at much lower cost than the ordinary leather sole. Owners of plants for heelbuilding, it is believed, will find themselves in a position to adopt the new process conveniently.

It is also claimed that the novelty of the patent may be enhanced by an ingenious arrangement of strips of rubber attached to a thin layer of canvas, the rubber strips fitting into the interstices of the leather sections. This is said to give a pleasing resiliency to the step of the wearer.

UNITED STATES RUBBER CO. CONSOLIDATES SUBSIDIARIES.

At a special meeting of the stockholders of the United States Rubber Co., held at New Brunswick, New Jersey, on February 14, it was voted unanimously to authorize the carrying out of the plans proposed. The vote was the largest ever held at a stockholders' meeting. Proxies of 83 per cent of every class of stock outstanding were represented.

One proposal was to acquire the real estate, plants and equipment of the companies of which this company owns, or shall own, substantially all of the common capital stock. The effect of this vote is that the following plants will become part of the parent company: Revere Rubber Co., Rubber Regenerating Co., the Naugatuck Chemical Co., the Eureka Fire Hose Manufacturing Co., American Rubber Co., the Joseph Banigan Rubber Co., Boston Rubber Shoe Co., L. Candee & Co., Goodyear's India Rubber Glove Manufacturing Co., The Goodyear's Metallic Rubber Shoe Co., Hastings Wool Boot Co., National India Rubber Co., Shoe Hardware Co. and Woonsocket Rubber Co.

A similar action by the General Rubber Co. stockholders added the following: Morgan and Wright, Hartford Rubber Works Co., G. & J. Tire Co., Mechanical Rubber Co., Mechanical Fabric Co., New York Belting & Packing Co., Stoughton Rubber Co., Peerless Rubber Manufacturing Co., Fabric Fire Hose Manufacturing Co., Midgeley Manufacturing Co., Sawyer Belting Co. and India Rubber Co.

It was also unanimously voted to confirm the directors' plan for a bond issue, all of which is included in the comprehensive plan by the Secretary of State of Connecticut, where this asso-

THE RUBBER ASSOCIATION OF AMERICA, INC., AUTHORIZED.

The change of name of The Rubber Club of America, Inc., to The Rubber Association of America, Inc., has now been authorized by the Secretary of State of Connecticut where this association is incorporated.

Members of the Association have been notified that shipments of rubber goods may now be made direct to the Portuguese islands of the Atlantic, namely the Azores, Cape Verde and Madeira islands. In this connection the British Consul General at New York states that the British War Trade Department feels considerable apprehension lest the ports of Portugal may come to be used for landing goods destined for Spain or elsewhere. Members are urged to send no rubber goods to any Portuguese ports not intended exclusively for consumption in that country.

Secretary Vorhis has sent the members a circular stating that the embargo conditions are not relaxed in any way, with the above exception, and advises that rubber manufacturers again notify their export managers of the terms of their bonds and guarantees so that all engaged in the export trade will be fully informed regarding the situation, and cannot plead ignorance, in the event of violations.

RUBBER COMPANY DIVIDENDS.

The New York Rubber Co. paid a regular dividend of 8 per cent and an extra dividend of 2 per cent on February 1.

The Hood Rubber Co. paid a regular quarterly dividend of 1½ per cent on preferred stock on February 1 to stockholders of record January 27.

The board of directors of The B. F. Goodrich Co. has declared a dividend of 3½ per cent on preferred stock, payable 1¼ per cent on April 2 to stockholders of record March 23, and 1¼ per cent on July 2 to stockholders of record June 22; also a quarterly dividend of 1 per cent on common stock, payable May 15 to stockholders of record May 4.

EDW. A. BARRIER.

BORN and brought up in Cambridge, Massachusetts, Edw. A. Barrier received his education in the Cambridge schools and was graduated from Massachusetts Institute of Technology in 1905. The rubber industry having appealed to him, he was employed for a time by the Boston Woven Hose & Rubber Co.,

Cambridge, Massachusetts, in a number of different departments with the idea of learning the business. He soon went into teaching, however, first as assistant instructor in analytical chemistry at the Massachusetts Institute of Technology and later as instructor in analytical and metallurgical chemistry in the University of Cincinnati, Ohio.

In 1907 Mr. Barrier became connected with the Inspection Department of the Associated Fac-



E. A. BARRIER.

tory Mutual Fire Insurance Cos. as chemical engineer, and established and organized a chemical laboratory for the examination and testing of rubber and other products. This was one of the first laboratories established in the country which seriously took up the chemical examination of rubber from the consumers' standpoint. As chairman of the Rubber Products Committee, the Sub-Committee on Cold Water Hose and a member of the Pump Valve Committee of the American Society for Testing Materials, Mr. Barrier has played a considerable part in the development of specifications for rubber products, having conducted investigations along these lines, some of the results of which have been published in various periodicals.

RUBBER COMPANY SHARE QUOTATIONS.

The following market quotations of shares of rubber manufacturing companies on February 24 are furnished by John Burnham & Co., 115 Broadway, New York City, and 41 South La Salle Street, Chicago, Illinois:

	Bid.	Asked.
Van Rubber Co. (new)	72	
Firestone Fire & Rubber Co., common	144	147½
Firestone Tire & Rubber Co., preferred	107	109
The B. F. Goodrich Co., common	55½	56½
The B. F. Goodrich Co., preferred	108	110
Goodyear Tire & Rubber Co., common	71	75½
Goodyear Tire & Rubber Co., preferred	106	108½
Kelly-Springfield Tire Co., common	53	54
Kelly-Springfield Tire Co., preferred	90	93
Miller Rubber Co., common	253	257
Miller Rubber Co., preferred	105	106¾
Portage Rubber Co.	164	168½
Swinehart Tire & Rubber Co.	79½	85½
United States Rubber Co., common	53½	54½
United States Rubber Co., preferred	105	109

CINCINNATI RUBBER MANUFACTURING CO. MEETING.

At the annual meeting of the stockholders of The Cincinnati Rubber Manufacturing Co., Cincinnati, Ohio., on February 13, the following directors were elected: S. D. Baldwin, F. A. Geier, Jas. A. Green, S. E. Hilles, Geo. McG. Morris, Casper H. Rowe, Stanley M. Rowe, F. D. Scherl; and on reorganization of the board, the following officers were elected for the ensuing year: S. D. Baldwin, president; F. D. Scherl, vice-president and treasurer; S. M. Rowe, secretary. The company has had a prosperous year and the outlook for business the present year is favorable.

PERSONAL MENTION.

Fred H. Ferguson, for over 20 years a salesman of the Boston Belting Co., in Buffalo, New York, and vicinity, has taken the agency for the New Jersey Car Spring & Rubber Co., Jersey City, New Jersey, covering the same territory.

J. A. Kurvy, formerly with Taylor, Armitage & Co., New York City, is now associated with Forney & Co., 350 Broadway, New York City, dealer in sheetings, drills, osnaburgs and special fabrics used by the rubber trade.

Edwin Curbishley, manager of the Xylos Rubber Co., Limited, Manchester, England, manufacturer of reclaimed rubber, recently called on the American rubber trade.

P. J. Ramler, recently connected with the sales department of the Racine Rubber Co., has been appointed manager of sales for the Vulcanized Products Co., Muskegon, Michigan.

E. B. Merriam, for several years assistant engineer of the switchboard department of the General Electric Co., Schenectady, New York, has resigned that position to assume the management of the industrial service department recently organized to supervise education, employment, and provision of opportunities for advancement of employees at the Schenectady plant of the company. He brings to his new position a broad and sympathetic understanding of the requirements of the situation.

F. Richard Carroll is the new district manager for The B. F. Goodrich Co., at San Francisco, California, succeeding C. E. Cook. Mr. Carroll has been manager of the Los Angeles, California, branch for the past six years, and on the eve of his departure from that city, was given a surprise dinner by the Goodrich organization in the South, at which a handsome gold watch and chain were presented to him.

George B. Hodgman, president of the Hodgman Rubber Co., Tuckahoe, New York, and Mrs. Hodgman celebrated the twenty-fifth anniversary of their marriage by entertaining a large number of their friends at a dinner and dance in the ball room of the Ritz Carlton Hotel, New York City, February 23.

FROM THE FAR EAST.

Dr. J. G. C. Vriens, of Medan, Deli, east coast of Sumatra, for the last three years technical adviser of the "Association des Planteurs de Caoutchouc de la Belgique," and for the ten previous years director of the experimental station for tea and tobacco cultivation in Sumatra, was in New York last month, on an enforced supplementary visit. He left Medan some months ago to visit his native city, Rotterdam, visiting Japan, Hawaii and many points of interest in the United States en route, and embarked on the "Ryndam" for Rotterdam, which steamer, when nearly in sight of Europe, was ordered by wireless to put about and return to New York. Doctor Vriens predicts a great future for the rubber plantation industry in Sumatra, with a steady increase in direct shipments from there to this country.

J. C. MATLACK RETIRES FROM AJAX CO.

J. C. Matlack, secretary and general manager of the Ajax Rubber Co., Inc., New York City, tendered his resignation at the annual meeting of the company, February 13. It is his intention to take a long rest at his home at Great Neck, Long Island.

Starting in business with the Simmons Hardware Co., in St. Louis, Missouri, he rose to the management of the bicycle and accessory department of that house and then went to A. Fetherstone Co., of Chicago, Illinois, as eastern sales manager. When the American Bicycle Co. was organized he became purchasing agent for the more than 60 factories. In 1901 he was made western sales manager, which position he resigned in 1902 to become president of the International Automobile & Vehicle Tire Co., Milltown, New Jersey. In 1907, when this company was suc-

ceeded by the Michelin Tire Co., he was made vice-president and general manager. In 1911 he left the Michelin company to connect himself with the newly organized Ajax Rubber Co., as secretary and general manager, and the success of that company under his able management is too well known to need further mention.

Mr. Matlack is too active and vigorous to retire and it is quite unlikely that he will content himself to remain out of business for any great length of time. He is succeeded in the Ajax company by Fred E. Dayton, who acts as general sales manager.

RICHARD A. LEIGH.

RICHARD A. LEIGH, general manager of the Dry Climate Tire Manufacturing Co., Arvada, Colorado, began his business career as an apprentice with the



R. A. LEIGH.

Revere Rubber Co., Chelsea, Massachusetts, in 1888, under the direction of his father, who was then factory superintendent. Later he became associated with the Boston Car Spring Co., Boston, Massachusetts, and from there went to the Reading Rubber Tire Co., which later merged into the Consolidated Rubber Works, taking over the plant of the Chelsea Fabric Co., Chelsea, Massachusetts. The firm was afterwards absorbed

by the United States Rubber Co. and the plant and machinery transferred to the National Rubber Co., Bristol, Rhode Island, with which Mr. Leigh was connected for five years. He then became tire expert for the Mechanical Rubber Co., Cleveland, Ohio, from which position he went to take up his present work. The Dry Climate Tire Manufacturing Co. is to be congratulated upon having as general manager a man of such long and varied practical experience in the manufacture and selling of rubber goods.

BATAVIA RUBBER CO. ABSORBS SIMPLEX RUBBER CO.

At a special meeting of the stockholders of the Batavia Rubber Co., held at the main offices of the company at Batavia, New York, February 23, the capital stock of the company was increased from \$500,000 to \$675,000 to provide for the purchase of the plant and other assets of the Simplex Rubber Co. of America, Ossining, New York. The Batavia company manufactures pneumatic automobile tires and the Simplex company solid rubber truck tires.

The merger of the two companies has also been authorized by the Simplex stockholders and the plant and organization will probably be moved to Batavia as soon as arrangements can be completed, and will occupy a site recently purchased by the Batavia company, adjoining its present factory. The consolidated company will be known as the Batavia Rubber Co. and will manufacture pneumatic automobile tires, solid rubber truck tires and a line of mechanical goods.

NEW INCORPORATIONS.

Amazon Rubber Co., The, February 6 (Ohio), \$500,000. L. J. Schott, Louis F. Smith, C. Bettler, J. Henry Adams, and Frank B. Burch. Principal office, Akron, Ohio. For the purpose of taking over the entire assets of The Amazon Tire & Rubber Company and operating the present plant on a much larger scale.

American Garter Co., February 9 (Delaware), \$125,000. Sidney C. Wallace, L. L. Cowan and R. Montgomery—all of Chicago, Illinois. To manufacture and deal in garters, hose supporters, etc.

Bulley Rubber Machinery Co., February 9 (Delaware), \$100,000. Herbert E. Latter, and Norman P. Coffin, Wilmington, Delaware, and Clement M. Egner, Elkton, Maryland. To manufacture all kinds of machinery and appliances adaptable to the milling, mixing and compounding of rubber and rubber cements.

Central Vulcanizing Works Inc., February 17 (New York), \$10,000. Jacob Brown and Tillie Brown, Albany, New York, and B. F. Barford, Valatie, New York. Tire repair and sales business.

Clouse Tire & Repair Co., The, December 11 (Ohio), \$25,000. J. E. Phillips, 6513 Euclid avenue; A. W. Gillespie, 1779 East Sixty-fifth street; M. Clouse, 2114 East Eighty-third street—all in Cleveland, Ohio. Principal office, 6513-6515 Euclid avenue, Cleveland, Ohio. To take over the Clouse Tire Repair School Co.

Double Fabric Tire Co., January 10 (Indiana), \$900,000. W. H. Willennar, A. L. Murray, Simon J. Straus and Isaac D. Straus. Principal office, Auburn, Indiana. To manufacture and sell tires, tubes, and tire accessories.

Endurance Tire & Rubber Corporation of New York, January 27 (New York), \$1,000,000. Harry G. Smith, Benjamin F. Norris, and Frank B. York—all of 271 Broadway, New York City.

Finebergs' Auto Tire & Accessory Co., January 29 (New Jersey), \$100,000. Isaac Fineberg, Herman Fineberg, Samuel Fineberg—all of Trenton, New Jersey. Principal office, 10-12 East Hanover street, Trenton, New Jersey. To deal in tires, etc.

Grayson, S. J., Inc., February 16 (New York), \$2,000. S. J. Grayson, Hohokus, New Jersey; Charles Netter and Robert Netter, 220 Broadway, New York City. Tires and rubber goods.

Hoosier Tire Co., September 26, 1916 (Indiana), \$10,000. Eugene M. Fife, W. R. Fife, and E. H. Fife—all of Indianapolis, Indiana. Principal office, Indianapolis, Indiana. To deal in tires.

Jones Rubber Heel Co., Inc., February 5 (New York), \$25,000. A. H. Serrell, Woolworth Building; James J. Jones, 13 Park Row, and Edward O. Towne, 214 West Ninety-second street—all in New York City.

Kirkham, I. C., Sales Co., Inc., January 24 (New York), \$12,000. Isaac C. Kirkham, 1365 Bedford avenue; E. A. Carleton, 959 Bedford avenue, and M. L. Kirkham, 1246 Pacific avenue—all in Brooklyn, New York. To deal in auto tires, etc.

Kokomo Rubber Tire Co., Inc., January 27 (New York), \$5,000. William Adelson and Edward J. Carter, 15 Broad street, and Thomas H. Keogh, 52 Broadway—both in New York City. To manufacture tires, etc.

Lambert Tire Co., January 3 (Washington), \$5,000. H. S. Chapman, M. F. Landrith, L. W. Lemon.

Laravie, O. J., & Co., Inc., January 29 (New York), \$2,000. Oscar J. Laravie and Emogene S. Simons, Albany, and Clarence T. Dolson, Watervliet—both in New York. To deal in auto tires, accessories, etc. Principal office, Albany, New York.

Liberty Tire & Rubber Co., Inc., January 29 (New York),

\$10,000. Joseph Prince, 119 East One-hundred and First street; Robert C. Schlesinger, 638 West One-hundred and Sixtieth street, and Leon Kronfeld, 400 Riverside Drive—all in New York City.

Marathon Tire Sales Co., January 10 (Indiana), \$25,000. R. P. Oblinger (president), H. E. Rasmussen (treasurer), M. M. Fancher (vice-president), and J. D. Meek (secretary)—all of Indianapolis, Indiana. Principal office, Indianapolis, Indiana. To manufacture and sell tires and rubber goods.

Morrow Insulating Co., Inc., February 1 (New York), \$25,000. John J. Morrow and Clara Morrow, 674 Academy street, New York City, and H. M. Lewis, 2055 Washington avenue, Bronx, New York. To manufacture insulating material, etc.

National Tire Protector Co., February 8 (Delaware), \$50,000. J. Daniel Melchior, Max F. Henkelman and F. J. Helnegel, all of Scranton, Pennsylvania. To manufacture and deal in all articles for the protection of automobile and motor vehicle tires.

Nuremburg Manufacturing Co., Inc., January 26 (New York), \$600. Robert B. Gunshor, Paul Hoffman and David Dricker—all of 55 Liberty street, New York City. To manufacture artificial trees, toys, etc., of rubber, paper composition and other materials.

Oakland Tire Co., Inc., February 13 (New York), \$50,000. Sydney Bernheim, 35 Nassau street, New York City; Catherine A. Weldon, 591 Seventh street, and Harry H. Jacobson, 555 Grand street—both of Brooklyn, N. Y. To manufacture all kinds of tires, etc.

Resilia Co., The, January 17 (Massachusetts), \$200,000. Frank D. Wilde, 225 Hunnewell terrace, Newton; Oliver E. Chapman, Sharon, and Marion E. Zink, 526 Washington avenue, Revere—all in Massachusetts. Principal office, Boston, Massachusetts. To manufacture and deal in certain patented articles to be used in connection with other articles or goods to furnish resiliency and elasticity.

Rochester Tire Works, Inc., January 24 (New York), \$5,000. G. C. Kingdon, Grace Horth and F. A. Scholls—all of Rochester, New York. Principal office, Rochester, New York. To deal in auto tires, etc.

Steiner, O. A., Tire Co., January 3 (Oklahoma), \$10,000. J. C. Treat (president), S. W. Steiner (vice-president), O. A. Steiner (secretary-treasurer), and E. L. Russell—all of Tulsa, Oklahoma. Principal office, Tulsa, Oklahoma. Automobile tires and accessories.

Sterling Tire Corporation, February 1 (Delaware), \$2,500,000. Joseph A. Miller, 227 Fairview avenue, Rutherford; Otto Basten, East Rutherford, and Bartlett Greene, Passaic—all in New Jersey. Principal office, 486 du Pont Building, Wilmington, Delaware. To manufacture and deal in rubber tires for vehicles of all kinds.

Vulcum Tire Filler Co., August 17, 1916 (Indiana), \$10,000. Franklin A. Colver, Joseph J. Greenen and Oliver J. Boulden. Principal office, Indianapolis, Indiana. To manufacture tire fillers and mechanical devices for the filling of tires.

Woodworth Manufacturing Corporation, January 3 (New York), \$125,000. Charles B. Woodworth and Desmond Woodworth, Niagara Falls; Elmer H. Paterson, Howard G. E. Smith, Buffalo, and Robert H. Mahaney, Lockport—all in New York. Principal office, Whirlpool street, Niagara Falls, New York. To manufacture and deal in automobile accessories of all kinds and description.

PROMOTING RUSSIAN TRADE.

Exporters of rubber goods desirous to increase their business with Russia, the largest and most favorable of our distant foreign markets, and one that is daily growing with a rising civilization and quickening development, can obtain valuable information in pamphlet form, also specific advice and assistance, upon application to the American-Russian Chamber of Commerce, New York City, the mission of which is to promote American-Russian trade relationships.

AJAX AND RACINE RUBBER COMPANIES.

At the annual meeting of the Ajax Rubber Co., Inc., New York City, held February 13, the following officers were elected:

Horace De Lisser, chairman of board, New York City; William G. Grieb, president, Scarsdale, New York; L. P. Destribats, vice-president, Trenton, New Jersey (in charge of Trenton plant). H. L. McClaren, vice-president, Racine, Wisconsin; Louis T. Vance, vice-president, Racine, Wisconsin (in charge of Racine plant). Harold W. Stimpson, treasurer, New York City; William J. Jackson, secretary, Brooklyn, New York.

These, together with the following, comprise the directorate: Herbert H. Maass, New York City; Robert A. Patteson, Tarrytown, New York; L. B. Patterson, Chicago, Illinois; Joseph Weissenbach, Chicago, Illinois; Hugh K. Prichitt, New York City; Fred E. Dayton, New York City; H. C. Severance, Racine, Wisconsin; Stuart Webster, Racine, Wisconsin.

The combined statement of the Ajax Rubber Co. and the Racine Rubber Co. for the period ending December 31, 1916, shows sales to the amount of \$10,335,177.70. The balance sheet may be summarized as follows:

Gross credits	\$12,684,463.26
Total debits	9,856,447.25
Gross profit from trading	\$ 2,828,016.01
Total expense	1,559,704.80
Net profit from trading	\$ 1,268,311.21
Assets	\$ 8,629,061.21
Liabilities, including capital stock, accounts payable, reserves and stock of Racine Rubber Co. in process of redemption	\$ 8,473,885.42
Surplus and undivided profits	155,175.79
	\$8,629,061.21

The Ajax company took over the Racine company last December, hence this combined statement.

At the annual meeting of stockholders of the Racine Rubber Co. held at Racine, Wisconsin, January 30, 1917, the following directors were elected for the ensuing year: W. G. Grieb, H. L. McClaren, L. T. Vance, Stuart Webster, H. C. Severance, Horace DeLisser, Louis P. Destribats. The directors then elected the following officers: H. L. McClaren, president and general manager; L. T. Vance, vice-president and general factory manager; Stuart Webster, treasurer; H. C. Severance, secretary and general sales manager.

MOTOR AND ACCESSORY MANUFACTURERS COMMITTEES.

At a meeting of the Motor and Accessory Manufacturers, held early in February, it was decided to admit to membership makers of airplane motors, parts and accessories. A decision was reached to considerably expand the credit department. Among the subjects discussed were the Administration's \$248,000,000 Revenue Bill and the pending Morrison Bill regarding registration of designs.

President C. W. Stiger of the Motor and Accessory Manufacturers' Association, has just announced the various committees to serve for the ensuing year. As has been the custom of The M. & A. M. for years past, President Stiger will also act as chairman of the Executive Committee. With him are: C. E. Thompson, E. H. Broadwell, James H. Foster, W. O. Rutherford, Christian Girl and Alfred P. Sloan, Jr.

First Vice-President C. E. Thompson has been appointed chairman of the Finance Committee, which is composed of the same men who constitute the Executive Committee.

The Show and Allotment Committee: Christian Girl, chairman; C. E. Thompson, E. H. Broadwell, J. H. Foster and William C. Rands.

William M. Sweet, former manager of The M. & A. M., who has for several years so successfully conducted the annual ban-

quet of The Motor and Accessory Manufacturers, has been appointed chairman of the Banquet Committee. The other members are: E. H. Broadwell, T. J. Wetzel, James H. Foster and Christian Girl.

Membership Committee: E. W. Beach, E. H. Broadwell and T. J. Wetzel. Auditing Committee: C. W. Stiger, president; Alfred P. Sloan, Jr., secretary, and L. M. Wainwright, treasurer. Aeronautic Committee: President Stiger, Vice-President Thompson and William M. Sweet.

THE KELLY-SPRINGFIELD TIRE CO. REPORT.

The net sales of the Kelly-Springfield Tire Co., New York City, for the year 1916 were \$10,883,182.76. This company did no war business during the year. It was this greatly increased demand for its products that caused the directors to determine to build the new and much larger factory at Cumberland, Maryland, previously announced in these pages.

STATEMENT OF INCOME AND PROFIT AND LOSS.

Gross profit	\$3,464,458.77
Less: Operating expenses, including selling, administrative and general expenses	1,404,388.26
Net operating income	\$2,060,070.51
Other income, net: Cash discounts, interest and miscellaneous	57,243.33
Net income for the year	\$2,117,313.84

BALANCE SHEET.

ASSETS.	
Cash in banks and on hand	\$ 983,511.76
Notes receivable	52,732.19
Accounts receivable	\$1,959,816.57
Less reserve for doubtful debts and discounts	109,231.51
Inventories, at cost	1,850,585.06
Charges deferred to operations	2,218,141.70
	22,373.81
Current assets	\$ 5,127,344.52
Sinking fund for debenture bonds: Cash and debenture bonds purchased	147,851.00
Plant accounts, good will and patent rights, less reserve for depreciation	7,887,356.95
	\$13,162,552.47
LIABILITIES.	
Accounts payable	\$ 187,910.80
Reserved for pay roll, taxes, etc.	98,327.98
Dividends and interest payable:	
Dividends:	
1½ per cent on first preferred stock issued, due January 3, 1917	\$53,899.50
Interest of 4 per cent on income debenture bonds outstanding, due April 1, 1917	10,800.00
	64,699.50
Current liabilities	\$ 350,938.28
50-year sinking fund 4 per cent income debenture bonds	270,000.00
(Cash and debenture bonds purchased, per contra, \$147,851.00)	
Capital stock:	
6 per cent first preferred	\$3,593,300.00
Common	4,907,200.00
	8,500,500.00
Sinking fund for redemption of stock and bonds:	
6 per cent preferred stock	\$ 75,164.00
4 per cent income debenture bonds	158,651.00
	233,815.00
Reserve for bonus distribution	111,731.38
Cumberland plant account, less factory site expense	238,827.81
Surplus and working capital, per annexed statement	3,456,740.00
	\$13,162,552.47

NEW LOS ANGELES BRANCH FOR FIRESTONE.

The Firestone Tire & Rubber Co., Akron, Ohio, recently established a tire distributing building at Los Angeles, California, said to be the finest and largest branch service building in that section. It is a three-story, reinforced concrete and stucco structure, decorated with ornamental tile and of Oriental style of architecture. An elaborate celebration marked the opening of the new branch, in which 500 Firestone dealers from Southern California, Arizona and Nevada, and municipal officials and prominent citizens took part. The Firestone officials who spoke were R. J. Firestone, vice-president; S. G. Carkhuff, secretary; E. W. BeSaw, western district manager, and A. T. Smith, branch manager.

FISK RUBBER COMPANY INSTALLS WRAPPING MACHINES.

In October, 1915, the Fisk Rubber Co., Chicopee Falls, Massachusetts, installed a machine for wrapping tires with burlap or paper, prior to shipment. This was the first machine of its kind ever built.

After having operated this machine successfully for more than a year, requirements demanded a second machine, which was duly installed.

This type of machine, which has a capacity of fifty bundles an hour, is not only being used in this country, but in Europe as well, where its efficiency is recognized on account of the scarcity of labor.

TRADE NOTES.

The Federal Rubber Co., Cudahy, Wisconsin, recently purchased a 4,000-horse-power turbine from the Allis-Chalmers Manufacturing Co., which will furnish power for the new mills and calenders to be located in the addition to the company's plant now in process of erection.

The Tubeless Tire & Rubber Co., Millersburg, Ohio, maker of tubeless and pneumatic automobile tires, has increased its capital stock from \$75,000 to \$1,000,000 for the purpose of selling its own products.

The Firestone Tire & Rubber Co., Akron, Ohio, announces through its Michigan manager, H. A. Coffin, that a building costing in the neighborhood of \$500,000 is to be erected on the company's leased site at the northeast corner of Woodward and Canfield avenues in Detroit, just opposite the present location. A portion of the new building will be sub-leased, but under conditions that will make it possible for the Firestone company to expand its facilities whenever necessary.

The Mohawk Rubber Co. of New York, Inc., has opened a branch at 86 Brookline avenue, Boston, Massachusetts, where a complete stock of tires made in its Akron, Ohio, factory will be kept on hand. Norman W. Biggart, of New York City, will be manager.

The Ten Broeck Tyre Co., Louisville, Kentucky, will manufacture the cotton fabrics needed in its production of rubber tires for automobiles and other vehicles and is now arranging to install an equipment for spinning and weaving. The new machinery will be used for making the fabric for the Atlasta puncture and blow-out proof tube, for which the company has contracted with the Servis Tire & Tube Co. to manufacture for a period of five years.

The Bowling Green Rubber Co. has removed its plant from Bowling Green, Ohio, to Toledo, Ohio, gaining thereby better shipping facilities and larger manufacturing space.

The Midland Tire & Rubber Co., Coshocton, Ohio, has increased its capital stock from \$10,000 to \$500,000.

At a recent stockholders' meeting of the Norwalk Tire & Rubber Co., Norwalk, Connecticut, \$500,000 additional preferred capital stock was authorized, \$250,000 worth to be issued at once, this action rendered necessary to care for the increased volume of business and additional manufacturing space and equipment.

The California Tire & Rubber Co., tire distributor, San Francisco, California, is capitalized for \$25,000, and operates an effective vulcanizing department in connection with its business. The principal officers of the company are Captain William H. Homer, president, and George C. Homer, vice-president and secretary. Wesley D. Smith is sales manager.

The Toliver Punctureproof Tube Co., Denver, Colorado, has moved into new quarters which have a capacity of 500 tubes per day. Joseph Stein is vice-president and general manager.

The H. H. H. Tire & Manufacturing Co., jobber of automobile supplies and accessories, Newark, New Jersey, takes possession on March 1 of an entire building at 21 Baldwin

street, which will serve as a general office and warehouse, the present store at 263 Halsey street being retained as a salesroom. This company has recently issued \$25,000 worth of preferred stock in order to obtain additional working capital to care for its greatly increased business.

At the recently held first annual meeting of the Hawkeye Tire Co., Des Moines, Iowa, it was voted to change the name to the Hawkeye Tire & Rubber Co. John Christie, president; John Fredericks, vice-president, and C. B. Hextell, secretary-treasurer, were all reelected.

The newly organized Red Cross Rubber Co., Norwalk, Ohio, expects to commence operations in the early Spring. C. V. Martin is manager of the company.

The National Tire & Rubber Co., East Palestine, Ohio, has recently been acquired by a syndicate of local capitalists. New plans deal with a material increase in the scope and province of the concern.

The plant of the Toledo-Findlay Tire & Rubber Co., Findlay, Ohio, was offered for sale February 13 but was not sold owing to the extreme cold weather and delayed railroad traffic. The next date of sale has not yet been decided upon.

The Amazon Tire & Rubber Co., Akron, has appointed Tritt & Gockley, Canton, Ohio, distributors for Stark and Tuscarawas counties, with exclusive selling rights.

The Ehman Tire & Rubber Co., succeeding the Vail Rubber Co., Chicago, Illinois, has become, under the direction of A. C. Ehman, its president, one of the important rubber manufacturing concerns of the West. The present output is 300 tires daily and an extensive line of mechanical goods and molded specialties. The additions now under construction will materially increase the capacity of the plant and there is every indication of a greatly augmented volume for 1917.

The Pennsylvania Rubber Co., Jeannette, Pennsylvania, has the contract to supply its Vacuum Cup tires for the 30 new motor vehicles of the Frank Parmelee Transfer Co., the principal transportation company of Chicago, Illinois.

The Centaur Tire & Rubber Co., Gallipolis, Ohio, is reported bankrupt. Pittsburgh capital was principally interested.

FIRESTONE APPOINTMENTS.

D. F. White, since 1910 head of the salesmen's department of the Firestone Tire & Rubber Co., Akron, Ohio, has been appointed Southern district manager.

W. S. Dellett has been given the managership of the Houston, Texas, branch.

R. L. Benham is now manager of the company's branch at San Antonio, Texas.

H. A. Lane, former salesman for the Firestone Tire & Rubber Co., is now manager of the Brooklyn, New York, branch.

NEW APPOINTMENTS OF THE GOODYEAR TIRE & RUBBER CO.

C. W. Martin, Jr., for five years manager of the motor truck tire department, has been placed in charge of the Southern district, with headquarters at Atlanta, Georgia.

R. S. Wilson, formerly in charge of the service department, is now manager of the motor truck tire department, G. E. Brunner, his assistant, being advanced to the position of manager of the service department.

W. R. Bliss, formerly manager of the Boston, Massachusetts, branch, has been made manager of the New York district, the assistant managership being given to D. M. Colwell, formerly manager of the Southern district.

B. S. Waterman, assistant manager of the New England district, assumes management of the Boston branch, continuing to care for the company's manufacturers' business in the New England district.

TIRE PRICE ADVANCES JUSTIFIED.

Official figures tend to show that rubber manufacturers were justified in raising prices for their products, as many of them did the first of the year. A comparative table of the figures of three leading companies that have recently completed their fiscal years has been compiled by a leading financial journal which shows the gross, net, and ratio of manufacturing expenses to selling price as follows:

	Goodyear.	U. S. Rubber.	Goodrich.
1915 gross	\$17,000,000	\$32,000,000	\$17,000,000
1915 net	7,003,000	12,500,000	9,550,000
1916 gross	\$20,000,000	\$33,000,000	\$20,000,000
1916 net	10,000,000	13,000,000	10,000,000
Ratio of manufacturing expenses to selling price	41.2 per cent	39.1 per cent	41.2 per cent

It will thus be seen that The B. F. Goodrich Co. to gain \$17,000,000 gross income over 1915 figures, had to spend \$20,000,000 more than in 1915. The United States Rubber Co.'s increase in gross income was \$32,000,000, but its profits were only about \$1,000,000 more than the previous year. The Goodyear Tire & Rubber Co.'s gross increase was 13 times as large as its net increase. Such figures are the best evidence that last year's selling prices were too low for safe business.

TIRE FABRICS BOOMING NEW BEDFORD

The unprecedented demand for tire fabrics has resulted in a great boom for New Bedford, Massachusetts, and the cotton yarn trade generally. It is estimated that fully one-third of the yarn spindles in that city are now running on tire fabric yarns and the consumption of long-staple cotton is tremendous.

New Bedford to-day is to the American cotton industry what Liverpool is to the British industry. It has become the largest spot cotton center in the East. Southern shippers are sending thousands of unsold bales there in order to make prompt deliveries when called upon, unaffected by transportation difficulties. Storage facilities during the past year have been increased to the extent of 100,000 bales, or nearly a quarter of the total consumption of New Bedford mills, and are still inadequate. The New Bedford Storage Co. is authority for the statement that during this cotton season 1,500,000 bales will be used within a 35-mile radius of New Bedford. That city itself will take 450,000 bales. Fall River the same, and the mills around Providence, Taunton and elsewhere in the vicinity will take 600,000 bales more.

Two new tire fabric yarn mills are being erected; the Sharp with 100,000 spindles and the Manomet with 75,000, while the new Rotch mill with 350 to 400 looms, the first weaving mill in New Bedford to make tire fabrics, seems likely to be the forerunner of a new and highly profitable industry there which is only slightly seasonal in character. Motorists do not put up their

cars in winter as much as formerly and the demand for tire yarns is remarkably steady. It has been estimated that about 2,500,000 pounds are being purchased weekly. About 75 per cent of all New Bedford tire yarn is made of Sakellarides Egyptian cotton, the balance being Sea Island. Most yarns are 22¾ to 23 count with some 20 count, usually combed though sometimes carded. For the most part they are sold single on section beams and the weaving mills ply them, usually elevenfold.

PROGRESS OF THE VICTOR RUBBER CO.

At the recent annual stockholders' meeting of The Victor Rubber Co., Springfield, Ohio, the following officers and directors were elected: H. H. Durr, president; F. R. Talbott, general manager and treasurer; Arthur Sackett, secretary; C. A. Swinchart, assistant general manager; H. J. Robben, vice-president; Ben Johnson, and John L. Bushnell.

General Manager Talbott reported satisfactory conditions for the year 1916 and even better prospects for this year. The plant has been in continuous operation night and day for over two years and although the company carries on a large business in rubber automobile mats, the principal increase has been in its pneumatic tires and tubes. A modern, second-story addition covering the present plant and more than doubling the floor space, will shortly be erected.

KING TUBELESS RUBBER CO. LOCATES AT YOUNGWOOD, PENNSYLVANIA.

The King Tubeless Rubber Co. has contracted for the purchase of the Fair Park at Youngwood, Pennsylvania, containing 30 acres and about 20 buildings of various sizes, about half of which can be readily adapted for tire manufacture, and the entire property will be reserved for expected future development. W. E. Russell is president of this company, which controls the use of all King Tubeless tire patents for the states of Pennsylvania and Maryland, under license from The Punctureless Auto Tire Co., Akron, Ohio, owner of the patents. The present branch office is at 3302 Grant Boulevard, Pittsburgh, Pennsylvania, and a Philadelphia, Pennsylvania, branch will be opened in the near future.

GORDON TIRE & RUBBER CO.

A stockholders' meeting of the Gordon Tire & Rubber Co., Canton, Ohio, has been called for February 28 for the purpose of voting to increase the capital stock from \$600,000 to \$1,000,000 to provide for enlargements of the plant now under way and to erect additions on the plot of land more than three acres in extent purchased recently from the city of Canton. Some of the additions will be completed and in operation by April 1, by which time the force will be increased from 200 to 300 hands. These enlargements are in the tire, tube and druggists' sundries departments. C. W. McKone has been promoted general superintendent. W. E. Ballsborough, formerly with the Star Rubber Co., Akron, Ohio, will have charge of the druggists' sundries department, succeeding M. B. Clark, who recently resigned. H. R. Platt, formerly with the Batavia Rubber Co., has been made superintendent of the tire and tube department.

At the last meeting of the directors C. W. Keplinger was re-elected president; H. B. McMaster, vice-president and general manager; C. J. Keplinger, secretary and treasurer, and they, with Isaac Harter, Judge Henry Harter, J. C. Keplinger, G. W. Ake and Samuel Ake, form the board of directors.

S. Hodge Smith, formerly at the Republic Rubber Co., Youngstown, Ohio, has been made superintendent of the Gillette Safety Tire Co., Eau Claire, Wisconsin.

A. A. Peterson will act as superintendent of the Globe Tire Co.'s plant at Laporte, Indiana.



CHAS. E. MILLER'S NEW BUILDING AT ANDERSON, INDIANA.

FIRST PAN-AMERICAN AERONAUTICAL EXPOSITION.

OF peculiarly timely interest, considering the present international situation, was the Pan-American Aeronautic Exposition at the Grand Central Palace, New York City, February 8 to 15, under the auspices of the Aero Club of America, the Pan-American Aeronautic Federation, and the American Society of Aeronautic Engineers.

Owing to the enterprise of the managers and of these associations, 25,000 or 30,000 tickets were sold in advance, and throughout the entire session the building was crowded with interested spectators. There were huge dirigibles, kite balloons, biplanes, monoplanes and other varieties of aircraft, accessories and war equipment. Special exhibits of remarkable interest were contributed by the United States Army and the United States Navy Aviation sections, Signal Corps, Weather Bureau and Bureau of Standards. There were more than 100 exhibitors.

Each day was devoted to some particular phase of the science of aeronautics and many men prominently interested in this line gave instructive addresses. Among those connected with the rubber industry who thus contributed were E. R. Preston, of the Goodyear Tire & Rubber Co., Akron, Ohio, whose address was "Coöperation with the Preparedness Movement"; Raymond B. Price, of the United States Rubber Co., New York City, spoke on "The Rubber Industry for Preparedness," and C. F. Smythe, of the Connecticut Air-Craft Co., New Haven, Connecticut, delivered an address on "Developing the Dirigible for Commercial Purposes."

Not many of the exhibits were directly connected with the rubber industry, but what they lacked in number they gained in prominence. Of course there were a number of rubber tires and shock absorbers for airplanes, but particularly interesting were the following exhibits:

The Connecticut Air-Craft Co. showed dirigibles and their housings. One of the company's dirigibles was suspended from the ceiling at the entrance of the Palace, and some types of the non-rigid Vedette for scouting and sporting purposes were also shown. The bags for these were made of a special fabric developed at the American factory of the United States Rubber Co., Cambridge, Massachusetts. The United States Rubber Co. also exhibited a line of balloon fabrics, a line of clothing and shoes for aviators, and a collection of mechanical sundries for airplanes, flying boats, etc., shock absorbers and rubber matting.

The Goodyear Tire & Rubber Co. exhibited a huge kite balloon such as was shown in the July, 1916, issue of THE INDIA RUBBER WORLD. This was suspended from the ceiling in the center of the exhibition hall and created great interest on behalf of the visitors.

One effect of the exhibit is the plan to purchase this kite balloon and present it to the government. The idea originated with Mrs. Charles A. Van Rensselaer, one of New York's most influential and public-spirited women. So strong was her desire to see the extension of the aeronautic defense arm of the government that she started a fund for the purchase of this balloon and the establishment of a training school for kite balloon operators, the plan being to locate this school at Governor's Island in New York Harbor.

THE ROYAL DUTCH CO. IN AMERICA.

The sale to Kuhn, Loeb & Co., New York City, of a block of shares of the Royal Dutch Co., principal competitor of the Standard Oil Co. in the world's markets, and owner of two petroleum producing companies in Oklahoma and California, seems to presage increased activity of this firm in the United States. It is known that the output of their wells is being greatly increased. In the absence of any authorized statement as to the intentions of the company, interested observers express the belief that in any event the new move will have a marked influence on the American gasoline and solvent naphtha situation.

AERONAUTIC MANUFACTURERS' ASSOCIATION.

ON February 9, during the First Pan-American Aeronautic Exposition in New York City, fifteen airplane manufacturers with a combined capital of \$30,000,000 and a total capacity of 175 machines a week, organized the Aeronautic Manufacturers' Association, pledged their full support and placed all their resources at the command of the government.

The organization will provide for the interchange of ideas concerning aeronautics of every kind and will arrange for the standardization of airplane manufacture.

The firms represented are: International Aircraft Co., Chicago, Illinois; The Burgess Co., Marblehead, Massachusetts; Curtiss Aeroplane & Motor Corporation, Buffalo, New York; Thomas-Morse Aircraft Corporation, Ithaca, New York; L. W. Flint Engineering Co., College Point, New York; United Eastern Aeroplane Co., Brooklyn, New York; Gallaudet Aircraft Corp., New York City; Brook Aircraft Co., Saginaw, Michigan; General Aeroplane Co., Detroit, Michigan; John D. Cooper Aeroplane Co., Bridgeport, Connecticut; Heinrich Aeroplane Co., Inc., New York City; Standard Aero Corp., Plainfield, New Jersey; S. S. Pierce Aeroplane Corp., Southampton, New York; The Benoist Corp., Sandusky, Ohio, and the American Motorplane Co.

AN AMERICAN AIRCRAFT FLEET.

The prospects are that henceforth rubberized fabrics for military purposes will be in greater demand than ever before. In accordance with its present policy of preparedness the United States Government contemplates the building of a formidable aircraft fleet and the work is already well under way. Early last month the government placed with The Burgess Co., Marblehead, Massachusetts, the largest order for airplanes and seaplanes ever given to one firm in this country. The number is not known, but as 200 men are already in the employ of the company and a new factory is in course of erection it is probably large, with the prospect of further orders. It is said that the new plant will be surpassed by only one other in the world.

An important conference was held in Washington the middle of the month, when the representatives of the United States Rubber Co., The B. F. Goodrich Co., the Goodyear Tire & Rubber Co., the Connecticut Aircraft Co. and the Curtiss Aeroplane & Motor Corp. met Rear Admiral David W. Taylor, chief constructor of the navy and head of the joint army-navy board of investigation of aerial problems. The conference resulted in an agreement whereby these firms will work together to furnish dirigibles for the use of the government.

The aeronautical department of the Goodyear Tire & Rubber Co., Akron, Ohio, is already at work on government contracts to construct war, kite and observation balloons, as well as to supply rubberized material for parachutes, ponchos, coats and blankets.

PROJECTED CASCADE TUNNEL WOULD BENEFIT THE RUBBER INDUSTRY.

Seattle, Washington, has latterly become an important port of entry for plantation rubber from the Far East. Manufacturers of rubber goods in the Middle West will therefore be glad to lend their hearty support to the project of General Henry M. Chittenden, chairman of the Seattle Port Commission, to build a 30-mile railway tunnel, the longest in the world, under the main range of the Cascade Mountains from Skykomish to Leavenworth, Washington. This would shorten the route 48 miles, lower the summit elevation 2,166 feet and reduce the running time of freight trains 8½ hours at a saving in maintenance to the Great Northern Railway which, together with the resulting traffic increase, would not render the estimated cost of \$50,000,000 unreasonable. It is to be hoped that the next decade may witness the realization of this gigantic scheme.

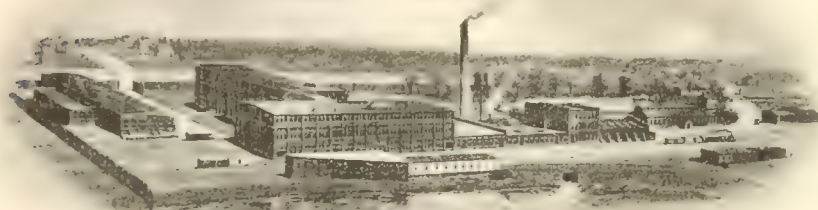
THE RUBBER TRADE IN BOSTON.

By Geo. A. Fair Correspondent

THE rubber footwear manufacturers in this state are unusually busy. There is a general complaint that it is impossible, or at least very difficult, to secure sufficient experienced help to keep the output up to the full capacity of the factories. At the same time the amount of orders already taken is far in excess of that at any previous year at corresponding date. These orders are for rubber overshoes, and for tennis lines. The latter style of footwear is to have a great boom, so it is predicted, as soon as warm weather comes, because of the high and still rising prices of leather shoes. The cheap "sneaker" is now simply a poor relation of the handsome styles of cloth top rubber-soled footwear, which, while originally designed only for sports and outing wear, will be worn for business and social wear also this coming summer.

* * *

The Plymouth Rubber Co., of Stoughton, shows a splendid record for the past year, its net sales being 28 per cent in excess of those for the year ending December 31, 1915; in fact, last



THE PLYMOUTH RUBBER CO.'S PLANT.

year's sales were the largest in the company's history, while the orders on hand for the present year are reported to be so large as to necessitate the erection of a new building as well as additions to some of the old buildings. Mention has been made of the plan to erect a reinforced concrete building 171 by 98 feet, 2 stories, but so built that another story may be added when occasion requires, this new building to be used entirely for the manufacture of rubber soles and heels, and to have a capacity of about 200,000 pairs per day.

The success of the company has been rapid. The present plant consists of 15 buildings ideally situated as regards transportation facilities on the spur track near the junction of two branches of the New York, New Haven & Hartford railroad, the majority of the buildings being less than 10 years old and some of the older having been largely added to and modernized. The plant has an effective water power.

The company manufactures "Slipknot" Safety heels and Durable Kompo soles, besides several lines of goods for the use of shoe manufacturers, and in addition to these, coated fabrics for the clothing trade, hospital sheetings, and artificial leather for the automobile and upholstery trade. We understand that a plan is under way to erect a three-story hotel, thus in part solving the housing problem for the employes of the company, and other improvements are in contemplation, though the plans are not yet sufficiently perfected to warrant publication.

* * *

Fred T. Ryder, the sales manager of the sole and heel business of the United States Rubber Co., started on a long trip the 17th of last month. His plans were to visit all the large cities between here and the Pacific Coast and interview the shoe jobbers

on the advantages of rubber soles. Many shoe manufacturers have adopted rubber soles for some of their lines, now that sole leather has doubled or trebled in cost, and Mr. Ryder's trip is mainly to secure the coöperation of the shoe wholesalers in further popularizing the use of rubber and fiber soles on moderate priced soles.

* * *

The rubber and fiber sole industry is receiving increased attention at the present time. A new enterprise is that of the Fibrehide Manufacturing Co., which has built a factory at South Braintree, for the purpose of manufacturing a line of soles and heels. This factory, which is two stories high and measures 240 by 160 feet, is expected to be ready for operation by the time this letter is read. The machinery is now being installed. The product is to be a rubberized felt, or a compressed body of cotton-felted fiber and rubber, vulcanized by a special patented process. The soles are "died out" from the sheet, thus doing away with the expensive process of molding, as is common with most rubber and fiber soles, an obvious advantage as regards cost of production. Frederick T. Ryder, Jr., is president and manager of the company and A. S. Dexter, of the Dexter Rubber Co., South Braintree, is the treasurer.

* * *

Large advertisements have appeared in the Boston papers, calling attention to the Pneumatic Cushion Inner Tube Co., which is now being organized for the purpose of manufacturing an invention of James P. Brophy, formerly superintendent of the Boggs Rubber Co., Birmingham, Alabama. The tube is of novel construction, having a combination of transverse and longitudinal "bulkheads," which form air compartments or cells, all connected. These cells are inflated, giving the air cushion effect of an ordinary inner tube, but in case of deflation, the

bulkheads are of sufficient strength to hold the resiliency, thus obviating the disagreeable necessity of replacing the inner tube on the road in case of accident. The tube is not yet on the market, but experimental sets have been run for more than a year with excellent service. The officers of the company are: President, George P. Brophy, treasurer of the automobile supply house of Brophy-Barrabee Co.; secretary and treasurer, Frank W. Hall, formerly general manager of the Boggs Rubber Manufacturing Co., of Birmingham, Alabama. James Brophy, the inventor of the tire, will be general manager of the new company.

* * *

The Batterman, Rood Rubber Co. is the name of a recent corporation, formed for the purpose of manufacturing rubber footwear. The capitalization is placed at \$150,000. It is the intention of the company to make a certain line of footholds and light rubbers for women, which can be retailed at a low price. The plans are to market the product in a somewhat original way, and through other retail establishments than regular shoe stores. The factory at Framingham is in charge of Arthur A. Cushman, formerly of Bristol, Rhode Island. The officers of the company are: Warren B. Rood, president; Robert W. Daniels, vice-president, and Thomas H. Dumper, secretary and treasurer.

* * *

At the annual meeting of the Alfred Hale Rubber Co., recently held in Boston, the stockholders elected David A. Cutler, Richard C. Storey, William G. Williams, William D. Lamond and Francis H. Swift, directors. The directors elected David A. Cutler president and treasurer and Richard C. Storey vice-president and clerk, and also voted to increase the capital stock from \$8,000

to \$18,000, declaring a stock dividend of 125 per cent for this purpose. The business of the last year has increased over the past five years by 150 per cent, and the company is planning to increase its facilities very materially in the near future.

* * *

The Boston Woven Hose & Rubber Co., Cambridge, Massachusetts, plans to double its authorized common stock from \$2,000,000 to \$4,000,000.

* * *

The good ship "Hypatia," often referred to as the flag-ship of the Monatiquot Rubber Works Co., has been offered for war service to the government by her owner, James H. Stedman, treasurer of the company.

In case of necessity she will be assigned to the Scout Patrol fleet now being organized by the government, and made up of privately owned crafts. A power boat of the "Hypatia's" type is manned by a crew of five. She will carry a large gun forward and an anti-aircraft gun at the stern.

* * *

A number of young men employed in the branch store and the selling agency of the United States Rubber Co. in this city have formed a self-culture club, and will hold weekly meetings at the Boston Young Men's Christian Union building. The speaker on February 14 was W. E. Piper, superintendent of the Boston Rubber Shoe Co., Malden, who gave an instructive talk which was highly appreciated. At a later meeting Samuel S. C. Chilcote, assistant to President Hotchkiss of the General Rubber Co., spoke on plantation rubber. Mr. Piper succeeded Frank A. Locke as superintendent of the Boston Rubber Shoe Co.'s factories, when Colonel Locke was elected president of the Boston Young Men's Christian Union some years ago. Since then this latter institution has greatly broadened its field of usefulness and is doing splendid social and educational work, and much of this extension of influence must be credited to this ex-member of the rubber industry.

* * *

Norman W. Biggart, of Danbury, Connecticut, representative of the Mohawk Rubber Co., of Akron, Ohio, had an exciting experience on the morning of the 10th of last month when the Hotel Lenox of this city caught fire. Mr. Biggart occupied a room on the seventh floor, where his escape by the stairway was cut off. He was rescued, however, by firemen, who reached him by an aerial ladder and conducted him safely to the ground.

* * *

Another rubber man who had a similar experience was A. H. Kerr, of the Chicago, Illinois, branch of the United States Rubber Co. He was awakened by the roar of the fire, and when he opened his door, was met by the advancing flames. Going to the window, he threw out a pillow, to attract the attention of the firemen, who immediately placed a ladder to his window, so that he escaped without injury. Mr. Kerr is a salesman in the heel and sole department of the company, and attended a conference of that division in New York a few days previous.

THE RUBBER TRADE IN AKRON.

By Our Regular Correspondent.

THE policy of The B. F. Goodrich Co. to encourage national military training is practically demonstrated in the offer of this company to employ Akron soldiers who enlisted and went to the border, in case they find their places in business houses filled on their return home. The operating committee states that the Goodrich factory can take care of all the soldiers from Akron who are able to qualify physically.

The \$10,000 prize given by the Goodrich company for the championship in driving contests throughout the year was recently awarded at the drivers' dinner at Chicago, Illinois, Dario Resta

receiving the lion's share. Resta used Silvertown tires exclusively throughout the 1916 racing season.



C. E. Cook.

* * *

C. E. Cook has been promoted to an important post at the Akron factory, in connection with the direction and operation of the 120 branches and stores and their thousands of employes selling Goodrich products. Mr. Cook was formerly manager of the Pacific Coast territory. As an evidence of the esteem in which he was held there his associates gave him a dinner and presented to him an elaborate silver service.

The Firestone Tire & Rubber Co. makes the interesting announcement that at last a circus is to be motorized by the United States Circus Corporation at a cost of \$1,000,000, and that the 100 3½-ton Kelly-Springfield trucks and 100 heavy Troy trailers necessary to move a six-ring show, together with the 1,200 persons, horses, menagerie and other miscellaneous paraphernalia are to be equipped with Giant single-tread solid tires. Never before has such an opportunity arisen to demonstrate conclusively the relative merits of single and dual tread tires for heavy transportation.

W. A. Bryan has been appointed to fill the recently created position of master mechanic at the Firestone factory. Mr. Bryan was formerly superintendent of the Akron motor truck plant of the International Harvester Corporation.

Two industrial fellowships in the study of the chemistry of india rubber have been established at the Municipal University of Akron, one by the Firestone Tire & Rubber Co. and the other by the Goodyear Tire & Rubber Co. These fellowships will yield \$300 per year each and will be open to graduates of standard American colleges who have completed a thorough college course in chemistry and are recognized as students of excellent ability. By action of the directors of the university, the holder will be exempt from all fees and will render certain services in instruction and laboratory supervision. At the end of the year of work at the Municipal University the holder of the fellowship will enter the employ of the company which has provided the fellowship, with the advantage of the basic knowledge of rubber chemistry acquired at the laboratory of the university.

* * *

The American Rubber & Tire Co. has let the contract for a 108 by 40-foot, four-story building of steel and brick construction, up-to-date in every respect. This addition will be used for the general extension of all departments of the plant, especially for the manufacture of the company's "Triple A" pneumatic tire and for the cord tire recently added to its line.

The capital stock of the company has been increased from \$500,000 to \$1,000,000, \$250,000 of which will be issued immediately. As this amount has already been provided for, the stock will not be offered to the general public.

* * *

At the recent annual meeting of the Akron Rubber Mold & Machine Co. the largest business in the history of the company was reported, and it was voted to buy further machinery and increase the production in 1917. The regular dividend was declared and officers reelected for the ensuing year, as follows: S. W. Harris, president and general manager; W. E. Wilson, vice-president and assistant general manager, and G. F. Hobach, secretary and treasurer.

This company has purchased about eight acres of ground, besides two tracts adjoining the present plant, for enlargement purposes, but has not yet decided when to build on the newly acquired property.

The Miller Rubber Co. increased its total sales from \$3,216,000 in 1915 to \$7,583,605.95 in 1916 with prospects from \$10,000,000 to \$12,000,000 sales for 1917. The 1916 figures are for 15 months, owing to a change in the fiscal year.

The surplus on October 1, 1915, was \$831,746.99. Earnings on October 1, 1915, to December 31, 1916, were \$952,952 with a total of \$1,784,699 less the common stock dividend of \$1,000,000 depreciation and expenses of increased capitalization of \$232,795.84 and dividends of \$259,958. With a total of \$1,592,753.94, the surplus on December 31, 1916, was \$291,945.

The company will issue \$500,000 in new common stock. Present shareholders will have the right to purchase shares of the new stock at par.

During 1916 the company doubled its factory and land holdings and is at present erecting a seven-story addition.

* * *

The admirable new plant of the American Hard Rubber Co., comprising buildings covering nearly ten acres, is equipped with the most modern machinery and appliances for the manufacture of hard rubber goods. The architect was Walter Kidde & Co., Inc., 140 Cedar street, New York City, who specializes in rubber mill construction.

* * *

At the annual meeting of the Amazon Tire & Rubber Co. the following officers were elected: L. J. Schott, president; L. F. Smith, vice-president; C. E. Bettler, treasurer; Dr. F. B. Richards and Albert Kroehle, directors, in addition to the officers. The company is building a standard pneumatic tire with an extra side-wall breaker strip or blow-out protection and reports a monthly increase in sales of about 140 per cent.

* * *

The Akron Biltwell Tire & Rubber Co., with executive offices at 405 Ohio Building, is having plans prepared for a new plant. The first unit will be four stories high, 100 by 200 feet, with power plant, the first story to be of reinforced concrete, fireproof construction. A large number of Cleveland people are stockholders in the new firm.

THE RUBBER TRADE IN RHODE ISLAND.

By Our Regular Correspondent.

MANUFACTURERS of rubber goods of every description in Rhode Island are working to capacity, with no apparent indication of cessation of the extraordinary demands.

The scarcity of desirable help still confronts the managers and is, perhaps, one of the most exasperating and ever present problems with which they have to contend. Because of this shortage several concerns, that would otherwise have built, have refrained from making additions to their plants. However, the aggregate output of the rubber factories of Rhode Island for the past two years has been something enormous, establishing a new record for the industry, and the end does not yet appear to be in sight.

* * *

The National India Rubber Co.'s plant at Bristol has been handicapped during the past few weeks on account of the congestion of freight, the local railroads having been utterly unable to move the accumulating output. The establishment is still engaged on an extraordinarily large order of tennis shoes and will undoubtedly be pushed to its utmost for a number of months to come.

* * *

A two-story brick addition is being built to the box shop of the Alice mill of the Woonsocket Rubber Co., at Woonsocket. When completed it will be used in the manufacture of paper boxes for packing the company's goods.

* * *

The Davol Rubber Co. is making extensive alterations in the three-story brick building at its plant in order to afford additional room for several departments.

The Mechanical Fabric Co., Providence, has recently discharged a mortgage of \$28,000 held against its real estate by Lotta P. Kelley.

* * *

The Town Council of East Providence has voted to purchase 300 feet of fire hose for use of the town's fire companies. Of this 150 feet has been purchased from the Boston Woven & Rubber Hose Co., and 150 feet from the Quaker City Hose Co.

* * *

The BeSaw Tire Co., 50 Franklin street, Providence, is being conducted by A. C. Bartlett, according to information filed at the office of the city clerk.

THE RUBBER TRADE IN TRENTON.

By Our Regular Correspondent.

SIX men employed in the vulcanizing department of the Luzerne Rubber Co. narrowly escaped death, though unscathed, when one of the huge vulcanizers blew up, demolishing one entire wall of the building and shattering windows in another factory some distance away. The only explanation that has been made is that there must have been defective metal in the vulcanizer. It was not an old apparatus and those in charge claim that everything was apparently in good order a short time before the accident. While the damage done to the building is considerable, the chief concern of the company is to get things in shape for turning out of orders, as the plant is rushed with business.

* * *

The Empire Rubber & Tire Co. is to be reorganized under the name of the Empire Tire and Rubber Corporation, with a capital stock of \$6,000,000, of which \$1,500,000 is preferred, \$3,000,000 common, issued, and \$1,500,000 reserved in treasury for converting preferred.

* * *

The Globe Rubber Manufacturing Co. recently awarded a contract for a large brick addition to its plant on Prospect street.

* * *

Efforts are being made by the Trenton Chamber of Commerce to have the Ford Motor Co. locate a plant in Trenton. This action follows the decision of Henry Ford to not erect a plant at Harrison, New Jersey, as he had contemplated doing. Rubber tire manufacturers are interested in the outcome of the negotiations.

* * *

The Automobile Owners Co-operative Association, organized in this city to supply tires to members, is said to be contemplating the equipment of a factory for making tires. It is said there have been large numbers of near-by motorists to subscribe for stock in the concern.

* * *

The Trenton Automobile Show will be held in the Second Regiment Armory from March 21 to 24, inclusive. Tires and other rubber goods will be elaborately displayed in the section devoted to automobile accessories.

A SYNTHETIC RUBBER ENTERPRISE.

The latest synthetic rubber proposition has been launched in Tacoma, Washington, by Morton Gregory, who proposes to produce rubber from Puget Sound products.

Mr. Gregory, who has been experimenting for several years, claims that the feasibility of his process has been demonstrated in a number of laboratories during the past year. He has leased 3,800 square feet of municipal dock property on which to conduct his operations. It is stated that the project has been adequately financed by eastern capital.

TIRES CARRY MORE THAN STEEL RAILS.

RUBBER-TIRED vehicles provided a passenger and freight service in the United States estimated at \$1,725,000,000 for the year 1916, a total so enormous that more and better highways now constitute the greatest transportation need in America. This conclusion was based upon the startling figures presented by Alfred Reeves, general manager of the National Automobile Chamber of Commerce, at the highway engineering meeting held in New York, December 28. They show that automobiles are now rendering a greater passenger transportation service than all the steam railways of the country, or than all the urban and interurban electric roads combined, and that the automobile freight traffic is also assuming enormous proportions.

According to the Bureau of Railway Economics the steam railroads carried 1,053,000,000 passengers in 1914, with little increase in 1916, an average distance of 33 6/10 miles, or a total of 35 1/4 billion passenger miles, and earned a revenue of \$700,400,000 on this service. By comparison, the 3 1/4 million passenger automobiles now registered in the country, averaging 5,000 miles a year, and three passengers per car, gave a service of 48 3/4 billion passenger miles, worth 975 million dollars on the railroad basis of two cents per mile, or over 200 million more than the railroad passenger service.

The street and electric railroads carried 9 1/2 billion passengers in 1912 (the latest year for which official figures were available). The average distance traveled was four miles, making 38 billion passenger miles. This produced a little more than half a billion dollars, averaging 1 1/3 cents a mile. At this rate of fare, the automobiles rendered a service this year of 598 1/2 million dollars, or about 98 million more than the street railways.

The 250,000 commercial motor vehicles in the country, averaging 50 miles a day, half the distance with an average load of two tons, give a total of 3 3/4 billion ton-miles annually. Taking 20 cents per ton-mile as a fair average cost of hauling by horse-drawn vehicle on the public roads, this is worth 750 million dollars a year.

SCALE FOR WEIGHING TIRE CASINGS.

A convenient accessory to facilitate the weighing of tire casings is shown here in connection with a hanging scale. This consists of a hook of sheet metal, so formed as to receive readily and firmly hold the tire. The scale, which is of the "no spring" variety, is furnished with a 100-pound chart graduated to quarter-pound divisions, or with a 50-pound chart having two-ounce graduations if preferred. The entire arrangement can be so placed at some convenient point on the shipping room wall, that the adjustment of the tire and the reading of the register are almost instantaneous. [Toledo Scale Co., Toledo, Ohio.]

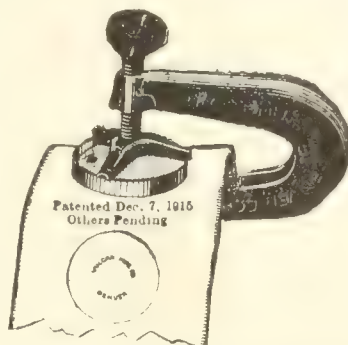


PORTABLE TUBE VULCANIZERS.

Two very light and simple tube vulcanizers of the pocket variety have been offered to the motorist trade recently. In

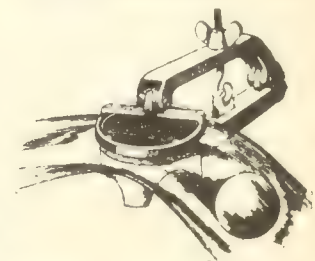
appearance they resemble nothing more than an ordinary clamp, the upper jaw of which forms the heating pan, while the clamp is tightened on the part to be repaired by a thumb screw.

In the Low vulcanizer the heat is furnished by a disk



LOW'S FIVE MINUTE VULCANIZER

of cardboard saturated with a combustible which, when placed in the pan and ignited, will burn without flame, and produce the correct heat for curing. The



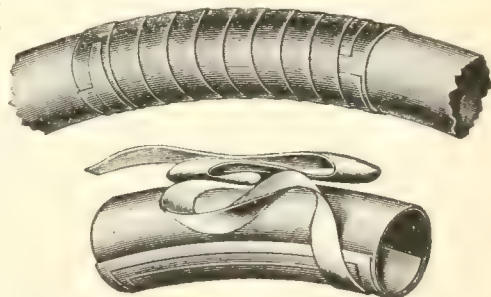
MARVEL JUNIOR VULCANIZER.

Marvel Junior uses a composition fuel tablet that burns slowly, yet radiates sufficient heat to cure the repair properly.

KEYSTONE ADJUSTABLE BLOW-OUT PATCH.

This blow-out patch is made of rubber and fabric, and, it is claimed, eliminates the common difficulty caused by the tire swelling after a patch is placed over the crack and thereby gradually forcing the patch through the hole by the pressure of the inner tube. This improved tire accessory, which has recently been patented, is applied as follows:

The inner tube is blown up to its normal size, which will nearly fit the inside of the casing, as is customary when inserting the inner tube at any time. The patch is then put



and the strip which will be seen in the illustration is wrapped around the patch, which is then put in the casing over the crack and the tire put on the rim as usual. When the tire is inflated, the blow-out patch, if not backed enough to fit the tire, will allow the strip to unwrap until the patch comes in contact with the inside of the casing and the pressure of the patch against the casing prevents it from unwrapping any further. In this manner the inner tube is tied down and the pressure is taken off of the casing and is on the patch instead, and therefore will not cause the tire to swell.

These patches are supplied in three sizes: No. 1 fits a 3 and 3 1/2-inch tire; No. 2 fits 4 and 4 1/2-inch tires, and No. 3 fits 5 and 5 1/2-inch tires. [Keystone Rubber Manufacturing Co., Erie, Pennsylvania.]

The addition to the shipping department of the Pennsylvania Rubber Co., Jeannette, Pennsylvania, now in process of erection, will double its capacity and assure the prompt and efficient handling of the company's rapidly growing business.

The Birch-Hintz Manufacturing Co., maker of "Birch" pump valves, rubber molds and machinery for rubber factories, is now located in its new factory building at 1000-1100 South Kilborn Avenue, Chicago, Illinois.

The Rubber Trade in Great Britain.

By a Special Correspondent.

NOT for several years has the winter been so severe and inclement. The rivers have been frozen, and the snow deep and lasting. This has caused a heavy demand for galoshes, and, at the present time a scarcity which is very discouraging to dealers. The streets have been in an execrable condition for weeks, and the run on overshoes is extraordinary. Indeed, one dealer reports having sold over 1,000 pairs in a single day. Many dealers sold their entire stocks and could not restock, but others were able to get Canadian or United States goods. The latter, though 50 to 75 per cent higher in price (at the retail shops) than British made overshoes, do not wear so long, because the Americans sacrifice durability for appearance. It must be confessed that the imported shoes are more attractive.

Rubber footwear manufacturers have been and are now running their works to the utmost capacity, mainly on government orders. Trench boots, overshoes and overboots are absolutely essential to our brave men at the front. Whilst our manufacturers have been so engaged, it has been necessary to import civilian galoshes, and hundreds of thousands of cases of these have come from American manufacturers, who are also capturing the foreign trade which our manufacturers cannot supply, whilst their whole output is taken up for war requirements. When the war is over and the government war orders cease, our manufacturers will have a strong fight to get back the business which has been captured by foreign competitors.

MECHANICALS EXPORTS SUFFER.

The same situation is noted in the export of mechanical rubber goods and asbestos packing to Latin-American countries. As an example, it is stated that the importations of rubber and asbestos packing and mechanical goods by Brazil and Argentina during the five years immediately preceding the war were:

	Kilos.	£ Sterling.
1909.....	243,766	15,422
1910.....	282,946	17,974
1911.....	258,599	17,061
1912.....	353,779	20,452
1913.....	367,958	22,535

Of this trade Great Britain supplied some 45 per cent, Germany following with 40 per cent, Belgium with 5 per cent, and the United States with less than 3 per cent. Since the war the position has been entirely changed; of German exports there remain scarcely any, while the United States, profiting by the situation, has increased its trade with Argentina and Brazil by some 200 and more per cent.

PROOFING TRADE GOOD.

The proofing trade has been excellent also. This is particularly the case with those works where government orders are being filled. Especially busy are those who are proofing fabric for balloons and aeroplanes. This class of fabrics requires the highest quality of workmanship and material. Then the orders for trench capes and ground sheets for the government have monopolized the entire capacity of the works. Complaints are not rare that while the government practically commandeers the whole output, there are doubts about renewals when present contracts are completed.

Fears are entertained that cloth for proofing may become scarce. This may not be unfounded, but with the large importations of cotton, it would seem that such scarcity could not be because of want of raw material. The lack of labor in the textile works due to enlistments has greatly affected the output. This may be relieved to some extent in the Manchester district by the agreement between the labor unions and the Federation of Master Cotton Spinners Association whereby during the continuance of the war the rules may be relaxed to the extent that females and youths may work in some branches.

PETROL CONSERVATION

Tire people are worrying over the new rulings of the Petrol Committee which has refused to renew all full duty motor spirit licenses unless the holders are engaged in work of national importance in which continued use of the motor car or motorcycle is essential. Licenses now in force hold good until March 31 for motorcycles and till April 30 for private cars. On February 7 the use of petrol for char-a-bancs was prohibited. It is feared that this action will completely abolish pleasure motoring, and curtail the use of motor cars by business men to a great extent. In such case the tire industry must naturally suffer.

DUNLOP'S PROSPEROUS YEAR.

However, the tire business is not yet in the dumps, if one may consider that the net profit of the Dunlop Rubber Co., Limited, for the year 1916 was £432,400, the allocations £227,000, and the carry-forward £82,900. And besides this the company paid dividends of 15 per cent. The company found great difficulty in maintaining its labor force. The scope of the company's business had been widened, they had paid greatly enhanced wages, salaries and working expenses generally, without raising retail prices.

WORKING OVERTIME.

All the tire concerns report good business, the government orders more than making up for any falling off in civilian demand. Not only the tire factories but many in general lines are working to double capacity by employing double forces. A specially notable case is that of the Midland Rubber Co., whose works remain inoperative but six hours in the week. This stoppage is from noon till six at night on Saturdays. The works are running continuously, Sundays included, the rest of the time.

COMMERCIAL FAIRS.

The British Industries Fair is to be held at the Victoria and Albert Museum, and at the Imperial Institute Building from February 26 to March 9. In view of the risk of interference with the output of munitions of war, it has not been possible to include in this fair certain trades which otherwise would have been invited to participate. The rubber trade is one which is thus excluded. The trades represented are the same as a year ago, namely toys and games; earthenware and china; glass; fancy goods; stationery and printing. A new and important development in this matter is the adoption of the fair principle by the municipality of Glasgow, on the same dates when the fair will be held there. The fair in Glasgow, which is to be held under the auspices of the Board of Trade of that city will be confined to textiles; ready made clothing; boots and shoes; foodstuffs; and domestic chemicals. Over 100,000 invitations to attend both fairs have been sent out to buyers in these trades.

MOTORCYCLES SOLD WELL.

In re the petrol curtailment, a side light on its effect is in the matter of motorcycles. Operatives in many lines of industry have been earning larger wages, and the consequence has been a wonderful increase in the sales of motorcycles, many ordinary workpeople buying them to save tramcar fares. Now that their licenses are refused renewal, and they are unable to get petrol for motive power, the machines must remain useless, unless some substitute is obtainable. Here is a chance for some of your American inventors to come to the rescue.

The general opinion is that the war cannot last through the present year, and with this in view plans are being discussed for readjustment of wages. The Chamber of Commerce recommends the following:

As regards the remuneration of employees, the principle of payment by results should, as far as possible, be adopted by employers and employed.

The basis of rates of payment for labor should involve such a scale as will insure for all willing and efficient workers a fair and reasonable standard of living.

The government should afford opportunities for considering the amendment of the trade disputes acts and of any provision of the factory and workshop acts other than those relating to the health of the workers.

Encouragement should be given, as far as possible, to profit-sharing and co-partnership agreements, or premium and bonus systems on lines which have proved beneficial to employers and employed in the past, subject to the special conditions of particular trades, and to the maintenance of the standard rates of wages.

CHEMICAL MANUFACTURERS ORGANIZE.

The Association of British Chemical Manufacturers has recently been organized to promote coöperation between manufacturers of chemicals and other allied products, to develop technical organization, to promote industrial research, efficiency and advancement. The management consists of twenty, and there are committees of various divisions. Group 8 treats of cellulose products, rubber and substitutes, and Group 5 distillation of coal shales, coal tar primary products. I have not been able to obtain the names of the committees of these groups up to time of writing.

LONDON AS A RUBBER MARKET.

THE following significant paragraph under the heading above, which is reprinted from "The India Rubber Journal" of January 27, indicates that British rubber associations are alive to the recent trend of the trade and may advocate stringent measures to protect London's prestige as the world's great rubber market:

The growth of direct shipments from the Straits and Ceylon to the U. S. A. has been watched by the London rubber market with some alarm, though the view has been confidently expressed in some quarters that London, because of its financial power, will reassert its superiority as a rubber center after the war. The exchange difficulty now manifesting itself in the East may be the straw which shows the direction the wind is blowing. The fact should not be lost sight of that the government have it in their power to divert the whole trade in British-grown rubber so that it passes through London and Liverpool. For various reasons this may be found expedient, and we shall not be surprised if it comes about.

AUSTRALIAN "HOMING" MOTOR TIRES.

Under this title the January 1, 1917, issue of the weekly bulletin of the Canadian Department of Trade and Commerce publishes an interesting article on the use of fiber tires for emergency purposes in Australia.

As in all other countries of vast distances and comparatively few traveling facilities, the advent of the motor car in Australia has, to a very considerable extent, solved the difficulties of transportation. In many parts of the country the roads are merely bush tracks or overland stock routes, on which herds of cattle are driven long distances to the city markets or coastal freezing works.

The rough nature of the country over which automobiles have to travel and the excessive heat often experienced have made the cost of rubber tires a serious item in maintenance, thereby causing many experiments to obtain a substitute for rubber at a moderate cost. The invention and recent perfection of the Australian "homing" tire is claimed to have met the emergency at a comparatively small cost. Tests with tires made of various kinds of fiber were carried out, with the result that coir fiber was found to be the most suitable for the purpose because of its lightness, cheapness, resilience, and durability. The greatest difficulty was to discover a method of joining the ends of the rope to make a complete circle of the same size, but eventually a new splice was invented, and the tire as now sold in Australia is said to be perfect of its type.

When first placed on the market the "homing" tire was sold as an emergency tire in case of a puncture or blow-out, but it

proved so satisfactory that in the country districts of some of the states the rope tires are frequently used on all the wheels of automobiles, particularly for station or ranch work and over rough and stony country.

The tires are bullet, nail and glass proof, and if a speed of 16 miles per hour is not exceeded it is claimed that they are almost as soft riding as pneumatic tires. It should be understood that the "homing" tire takes the place of both inner tube and cover, being attached to the rim by four or five straps.

THE RUBBER TRADE IN GERMANY.

By Our Regular Correspondent.

IN the bitter struggle for existence in which Germany is now plunged, it is difficult to write freely. One would like to do so, but one never can tell how vitally important some apparently innocent information may be. However, I believe that no secrets will be violated in telling you that those of our industries that have been working on government orders have, notwithstanding large contributions to war loans and various relief funds, made enormous profits, and that this "boom" period is being utilized for the purpose of carrying on vast mergers. Some of the industrial profits for the fiscal year 1915-16 were astonishing. The net profit of 19 representative rubber companies was 12,000,000 marks [\$2,756,000], against 10,000,000 marks [\$2,380,000] the year before. When this war comes to an end our rubber industry will be possessed of greater organization, efficiency and wealth than ever before, and we believe we know how to see that it will not lack raw materials. This brings me to synthetic rubber.

SYNTHETIC RUBBER.

As I have written repeatedly, I do not believe that synthetic rubber will remain an important factor when peace is reestablished. Our non-technical papers derive much satisfaction from the sarcasm they exercise in thanking our enemies for forcing



Underwood & Underwood, New York

SPRING WHEELS USED ON GERMAN AUTOMOBILES.

us to develop rapidly an invention which otherwise might have grown only slowly in the course of ages; but the fact remains that synthetic rubber is very costly and only suitable for a limited number of purposes. For tires, for instance, I do not believe artificial rubber will ever be able to compete with the natural product, and my belief is sustained by the number of bicycle tire substitutes which are offered and which contain no synthetic rubber, in fact any kind of rubber. The substances

most used are steel wire, leather, wood, prepared canvas, rubber substitute, and combinations of these substances.

WIRE TIRES.

The wire tire is made of steel wire, about 3/16 inch thick, which is worked into a very close coil, the two ends being welded together, so as to give it the proper shape. This product now sells wholesale at 12 marks [\$2.86], and retails at 18 marks [\$4.28], which is considerably more than the average price for rubber cycle tires just prior to the war. Besides its high price, the steel-coil tire has the additional objection that it cuts into the roads, is far less resilient than pneumatics, and is very noisy in use. Some users are said to have overcome the latter objection by inserting a layer of felt between the rim and the tire, but this certainly adds much to the cost of the tires.

WOODEN TIRES.

Wooden cycle tires, due to their low cost, have met with fair success. There are various types of these and they retail at from 4 to 6 marks [\$0.95 to \$1.43] apiece. Some are in one piece, others are sectional. The Continental Caoutchouc und Gutta-Percha Compagnie, of Hanover, is producing sectional wooden tires that are meeting with marked success. They are composed of 47 parts, which include 12 wooden tire sections of 3 different kinds, 12 tin plates, 12 screws, 10 connecting pins, and one thumbscrew. The tin plates are used to secure the sections to the rim, which must be of metal itself; the screws serve to attach the tin plates to the ends of the wooden sections; the connecting pins hold the sections together, and the thumbscrew is on a spindle put through the valve hole in the rim and is used to tighten the tire on the rim. This special type sells retail at 6 marks [\$1.43], which would be exceedingly satisfactory if it represented the whole cost to substitute rubber tires. In reality the expense is more than double, for in order to obtain reasonably easy riding qualities, the fork of the cycle has to be provided with shock absorbing springs, which are marketed by the Continental company and which retail at 7.50 marks [\$1.78]. This places the total cost of a set of tires at 19.50 marks [\$4.64].

Another type of wooden tire is made of one piece of wood, the outer surface of which is covered with a narrow strip of leather. Between the inside surface of the wooden tire and the rim several steel springs are placed, with a view to providing some elasticity. In addition to this both front and rear forks of the cycles are of the "cushion frame" type, provided with large, shock-absorbing steel springs. The cost of this outfit, including the two tires and the large springs, is 36 marks [\$8.57].

LEATHER AND CANVAS TIRES.

Several leather-covered and canvas-covered tires are made and sold. These are solid, the outer casings being of leather or prepared canvas, and the inner part consisting of wood and similar substances. To make this type of tire more durable, a steel tread is often provided. Prices for these tires vary; one fairly good leather-covered tire retails for 48 marks a set [\$11.42]; another for 70 marks [\$16.66].

"LOBO" TIRE.

The tire that has the strongest claim to being a real substitute for the rubber article is marketed under the trade name of "Lobo." It is the product of the Kunstgummi Gesellschaft, m. b. H. (Artificial Rubber Co.) of Chemnitz, Saxony, and is composed of 2 parts, corresponding to the inner tubes and outer casings of peace times. The inner part, which is the most important, is solid and is covered with cloth made into the shape of a tire. The tube thus formed is filled with a preparation in the nature of rubber substitute. The casing is built up of prepared canvas, and wears tolerably well. The price for a set of these tires is 52 marks [\$12.38], and is of course sufficient to restrict their use, so that it can be said that of all the cycle tires now offered and used, the sectional wooden tire of the Continental company is the most practical from the point of view of both price and service.

RUBBER PLANTING NOTES.

CEYLON RUBBER AUCTIONS POSTPONED.

REPORTS recently received give every indication of at least a temporary derangement in the financial transactions of this locality, caused by certain restrictions imposed by the India Council, thereby seriously impeding business in general, and further resulting in the postponement of the rubber sales.

It is generally expected, however, that immediate remedial measures will be adopted. Efforts are being made to place the labor situation on a more satisfactory basis than it has been for some time past.

CEYLON REPORT FOR 1915.

The Ceylon Report for 1915 has just been issued.

The year 1915 witnessed a considerable increase in the output of crude rubber, as young plantations came into bearing, and older ones increased their yield through better cultivation and tapping.

The area under *Hevea* rubber was approximately 240,500 acres, almost entirely in the hands of European planters, and ranged from sea level to 2,000 feet. Few new plantings were made, owing to lack of suitable available land, as *Hevea* does not thrive in the dry northern districts of the island, even under irrigation.

By far the greater amount of rubber was shipped as crêpe, though a certain amount of smoked sheet and biscuit was also made. Prices ruled satisfactorily throughout the year, the average price being 1.65 rupees [54 cents] per pound.

Experiments in the upbringing of plantations with green manure, seed selection, wide spacing, artificial manuring, and the best methods of tapping were carried out. Experts were engaged in research work connected with the physical problems concerning the tree, the latex, and rubber, and with the fungus diseases attacking plantation *Hevea* trees, which were somewhat serious in the wetter districts.

EXPORTS.

Exports of crude rubber constituted a record, the quantity being 43,574,800 pounds for 1915.

The United Kingdom and the United States continued as the principal buyers, their purchases being 55.12 per cent and 39.72 per cent respectively of the total, as against 62.9 per cent and 23.19 per cent in 1914.

Besides the United States, France, and Russia, the only other foreign country to be supplied was Japan, due to restrictions necessitated by the war.

EXPORT DUTY.

Under Ordinance No. 17 of 1869, as amended by Ordinance No. 5 of 1914, the export duty levied on crude rubber from October 1, 1915, is 7.50 rupees [\$2.48] per 100 pound.

IMPORTS OF RUBBER GOODS AT HAIKWAN, CHINA.

The Chinese Imperial Customs have just issued a volume giving the countries of origin of the principal imports into China during 1914-15. The following are the Haikwan imports of manufactures of rubber and gutta percha:

From—	Haikwan 1914.	Haikwan 1915.	Haikwan Increase or Decrease.
Great Britain	46,000	31,000	— 9,000
Germany	9,000	.....	— 9,000
France	14,000	21,000	+ 7,000
Russia	186,000	90,000	— 96,000
Japan	47,000	202,000	+ 155,000
Other countries	34,000	41,000	+ 7,000
Totals	330,000*	385,000	+ 55,000

* Includes 58,000 Haikwan taels reexported.

[The legal value of the Haikwan tael is .807 cents United States currency.]

Recent Patents Relating to Rubber.

THE UNITED STATES.

ISSUED JANUARY 23, 1917.

- N**O. 1,213,150 Breathing bag. R. H. Davis, London, England.
 1,213,215. Apparatus for cleaning tobacco pipes comprising a rubber bulb, pipe and washer. S. Kuprel, Bridgeport, Conn.
 1,213,256. Anti-skidding device. T. A. Pyros, Pittsburgh, Pa.
 1,213,290. Non-skid tire chain. C. R. Standley, Boone, Iowa.
 1,213,370. Bat comprising a rubber cushion. J. A. Hillerich, assignor to Hillerich & Bradshy Co.—both of Louisville, Ky.
 1,213,476. Pneumatic tire shoe. C. F. A. Gray, Montreal, Quebec, Canada.
 1,213,557. Cushion tire. J. T. Trotter, New York City.
 1,213,571. Combined bathing-cap and suit-bag. J. Zuckerman, New York City.
 1,213,606. Breast pump. J. T. Emott, Morristown, N. J., assignor to Puritan Chemical Co., a corporation of Massachusetts.
 1,213,697. Inner tube for pneumatic tires. B. C. Seaton, Nashville, Tenn.
 1,213,719. Cushion tire. J. F. White, Pittsburgh, Pa.
 1,213,725. Fountain pen. O. B. Anderson, Elizabeth, N. J., assignor to Eagle Pencil Co., New York City.
 1,213,726. Impregnated coil and method of making same. L. H. Baekeland, Yonkers, N. Y., assignor to General Bakelite Co., New York City.
 1,213,735. Air-tube for a pneumatic tire. H. Brown, Putney Hill, London, England.

ISSUED JANUARY 30, 1917.

- 1,213,814. Teat cup for milking machines. G. O. Anderson, Lancaster, Pa.
 1,213,834. Elastic wheel tire. R. Bunzlau and C. L. Stoll, assignors to the Firm "Sembusto" Elastische Radbereifungen Gesellschaft M. B. H.—all in Vienna, Austria-Hungary.
 1,213,949. Anti-skidding grip-tread for vehicle wheels. C. Reger, Danville, Pa.
 1,213,950. Cushion for billiard tables. E. Ringsmith, Morenci, Ariz.
 1,213,951. Recoil pad for gun butts. E. Ringsmith, Morenci, Ariz.
 1,213,967. Tire tool. M. H. Stewart, Detroit, Mich.
 1,214,004. Tire valve. J. A. Bowden, Los Angeles, Calif., assignor to A. Schrader's Son, Inc., Brooklyn, N. Y.
 1,214,028. Toy mustache with rubber part. F. H. Hainert, Jr., Minneapolis, Minn.
 1,214,065. Rubber pad for the soles and heels of boots and shoes. W. W. Phillips, London, England.
 1,214,072. Fountain drawing pen. T. J. M. Reynders, Rotterdam, Netherlands.
 1,214,087. Self-filling fountain pen. M. Shemin, Bayonne, assignor to J. L. Valentine, Jersey City—both in New Jersey.
 1,214,137. Resilient tire. L. E. Clawson, San Francisco, Calif.
 1,214,155. Tire. C. W. Gutzzeit, New York City.
 1,214,174. Resilient tire. L. H. Klocksien, Paton, Iowa.
 1,214,268. Air bag for mending pneumatic tires. J. W. Blodgett, Chicago, Ill.
 1,214,273. Tire protector. J. R. Cabanne, Seattle, Wash.
 1,214,291. Cushion tire. F. Fitzharris, assignor of one-half to E. J. Nixon—both of Texarkana, Tex.
 1,214,310. Fountain pen. S. Josselyn, Atlantic, assignor of one-half to S. C. Crocker, Boston—both in Massachusetts.
 1,214,321. Pneumatic tire. W. E. King, Topeka, Kans.
 1,214,478. Life saving suit. G. W. Magnus and J. O'Banion, Seattle, Wash.

ISSUED FEBRUARY 6, 1917.

- 1,214,537. Metal-studded tire. J. R. Gammeter, Akron, Ohio, assignor to The B. F. Goodrich Co., New York City.
 1,214,543. Elastic webbing hose supporting garters. M. B. Hammond, assignor to The Thomas B. Taylor Co.—both of Bridgeport, Conn.
 1,214,566. Resilient tire. G. E. Mallaby, East Cleveland, Ohio, assignor to Kelly-Springfield Tire Co.
 1,214,666. Composition sole for boots and shoes. J. A. Ford, Jamaica Plain, assignor to Plymouth Rubber Co., Canton—both in Massachusetts.
 1,214,670. Pneumatic tire comprising a breaker strip of soft rubber mixed with shredded fiber. W. C. Geer, Akron, Ohio, assignor to The B. F. Goodrich Co., New York City.
 1,214,777. Anti-skid device for wheels. C. G. Greenleaf, West Richfield, Ohio.
 1,214,781. Pneumatic tire pressure gage. C. Harrison and K. Lamond, assignors to Vancouver Motors Supply, Limited—all of Vancouver, British Columbia, Canada.
 1,214,807. Rim tool for automobile rims. G. E. Lundberg, Kewanee, Ill.
 1,214,811. Pneumatic vehicle wheel. L. Mayolino, assignor to Ruedas y Neumaticos Mayolino—both of Habana, Cuba.
 1,214,830. Moisture-proof switchboard cord. W. L. Runzel, assignor to Runzel-Lenz Electric Manufacturing Co.—both of Chicago, Ill.
 1,214,889. Sole for rubber shoes. S. W. Bourn, Providence, R. I.
 1,214,959. Illuminated fountain pen. E. O. Schaffer, Derby, Conn.

- 1,215,050. Hose coupling. F. X. Muller, assignor to Republic Hose Coupler Corporation—both of Buffalo, N. Y.
 1,215,064. Semi-metallic sheet comprising asbestos fiber, rubber, shredded metal and a filler. L. L. Ryan, assignor to The Royal Equipment Co.—both of Bridgeport, Conn.
 1,215,111. Cascade fountain for internal baths. E. Carlsen, Chicago, Ill.
 1,215,179. Anti-skidding attachment. A. Montanari, Pensacola, Fla.
 1,215,216. Non-skid tire. J. L. Swartz, Akron, Ohio.
 1,215,301. Portable track and tire protector. J. B. Munson and P. F. Hagerty, Phillipsburg, N. J.
 1,215,311. Bathing cap, embodying a flexible water proof body and a band of sponge rubber. Thomas W. Miller, assignor to The Faultless Rubber Co.—both of Ashland, Ohio.

ISSUED FEBRUARY 13, 1917.

- 1,215,349. Tool for repairing tires. C. Dierig, Lawrence, Mass.
 1,215,382. Art of making mottled rubber flooring. A. B. Kempel, Akron, Ohio, assignor to The B. F. Goodrich Co., New York City.
 1,215,449. Rubber soled shoe. M. W. White, Cliftondale, Mass., assignor to United Shoe Machinery Co., Paterson, N. J.
 1,215,450. Rubber sole shoe. M. W. White, Cliftondale, Mass., assignor to United Shoe Machinery Co., Paterson, N. J.
 1,215,475. Apparatus for nasal douches, injections and other like purposes. W. G. Brokaw, Paris, France.
 1,215,486. Vehicle wheel tire. M. Clark, Chicago, Ill.
 1,215,538. Eraser for fountain pen caps. W. W. Ihne, Chicago, Ill.
 1,215,577. Cushion tire. L. R. Reeder, assignor of one-half to W. J. Quillen—both of Akron, Ohio.
 1,215,582. Tire repair plug. R. W. Sampson, Melba, Whitestone, N. Y., assignor of one-half to L. Schwab, East Orange, N. J.
 1,215,717. Pneumatic tire. A. F. Ruthven, Kansas City, Mo.
 1,215,719. Tire plug. R. W. Sampson, Melba, Whitestone, N. Y., assignor of one-half to L. Schwab, East Orange, N. J.
 1,215,782. Tire signal pressure-gage. G. F. Diamond and E. T. Richards, Kingston, N. Y.
 1,215,861. A composition of matter composed of cameta, cauchó ball, and acra flake, for sealing pneumatic tubes. A. J. Rheubottom, New Albany, Ind.
 1,216,077. Automobile mat of rubber. E. A. Cohen and C. C. Colyer, Pittsburgh, Pa.
 1,216,240. Demountable rim. F. Lowe, Cambridge, Mass.
 1,216,244. Polishing roll comprising a body portion of rubber. A. McDowell; I. McDowell, administratrix of A. McDowell, deceased, assignor to V. H. McDowell—all of Lynn, Mass.

THE UNITED KINGDOM.

PATENT SPECIFICATIONS PUBLISHED.

In order to give the public the advantage of having abridgments of specifications up to date while retaining their numerical sequence, applications for patents made subsequent to 1915 are given new numbers when their complete specifications are accepted, or become open to public inspection before acceptance. The new numbers start with No. 100,001 (without any indication of date), and supersede the original application numbers in all proceedings after acceptance of the complete specifications.

[ABSTRACTED IN THE ILLUSTRATED OFFICIAL JOURNAL, DECEMBER 30, 1916.]

- 12,957 (1915). Gutta percha and rubber in armor construction for ships' fenders, etc. E. Sherring, 6 Birch Lane, Longsight, Manchester.
 12,998 (1915). Pneumatic tire. J. Donkin, 58 Porchester Road, Bourne-mouth, Hampshire.
 13,041 (1915). Cushion tire with sponge rubber filler. J. Guerrero, 6 Square de Messine, Paris.
 102,025. Respiratory appliances. R. H. Davis, 187 Westminster Bridge Road, London.
 102,040. Artificial foot with two rubber buffers at the ankle joint. E. Ernst, 80 Charlotte street, Fitzroy Square, London.
 [ABSTRACTED IN THE ILLUSTRATED OFFICIAL JOURNAL, JANUARY 10, 1917.]
 13,240 (1915). Overboot, New Liverpool Rubber Co., 292 Vauxhall Road, Liverpool, and I. W. Davies, 38 Whitham avenue, Great Crosby, Lancashire.
 13,257 (1915). Divers' dress. F. W. Walters, Manukau Road, Auckland, New Zealand.
 13,290 (1915). Tire inflating valves. M. S. Stevenson, 119 Victoria street, Westminster.
 13,371 (1915). Seat cushions containing inflated rubber balls for increasing the buoyancy of boats, rafts, etc. A. F. Emeric de St. Dalmas, "Tacotena" Lansdown Road, Sidcup, Kent.
 13,397 (1915). Device for supporting weak or damaged parts of tires. G. H. Broughton, 176 Montrose avenue, Toronto, Ontario, Canada.
 13,464 (1915). Tire comprising an inner tube, wood casing and rubber tread. C. H. Southall, 7 Vicker's avenue, Kirkstall, Leeds.
 13,470 (1915). Vulcanized india rubber ball. J. Liddle, 154 St. Vincent street, Glasgow.
 13,490 (1915). Massage and exercising apparatus. A. J. Bergomi, 6 bis Rue du Temple, Bordeaux, France.

Chemical Patents will be found on page 327. Machinery and Process Patents on pages 331-333.

- 50,269. Automobile tire. Term 14 years. Patented February 6, 1917. P. De Mattia and B. De Mattia, Clifton, N. J.
- 50,282. Tire casing. Term 7 years. Patented February 6, 1917. G. W. Odell, South Bend, Ind.

TRADE-MARKS.

THE UNITED STATES.

- 95,422. The word **SILVAREIGN**—waterproof fabrics used in the manufacture of waterproofed garments. C. Kenyon & Co., Brooklyn, N. Y.
- 95,787. A design comprising the monogram M. A. M. Co., and the word **MARVEL**—tire vulcanizers and tire vulcanizing patches. The Marvel Accessories Manufacturing Co., Cleveland, Ohio.
- 98,122. An illustration of a horse shoe and on either side of it a wing—inner tubes for tires, tires, and tire casings composed in whole or in part of rubber or its equivalent or of rubber or its equivalent and fabric. Racine Auto Tire Co., Racine, Wis.
- 98,769. The word **AD-ON-A-TREAD**—double tread tire repair patches and repair boots. The Miller Rubber Co., Akron, Ohio.
- 99,199. The words **SIN PAR**—rubber and rubber-lined fabric hose. Peerless Rubber Manufacturing Co., New York City.
- 97,604. The word **VELVETREAD**—rubber and fabric casings or shoes for pneumatic tires. The Standard Tire & Rubber Manufacturing Co., Cleveland, Ohio.
- 98,855. The words **MALTESE CROSS** and a representation of a Maltese cross—automobile and bicycle tires of rubber and fabric. Ajax Rubber Co., Inc., Millbrook, N. Y.
- 85,548. The word **ROADGRIP**—rubber vehicle tires. The Portage Rubber Co., Barberton, Ohio.
- 99,213. The words **WEE-NEE SQUAWKER**—toy balloons. The Miller Rubber Co., Akron, Ohio.
- 99,701. The words **THE TIRE RATE BOOK**—a periodical issued three times yearly. The Class Journal Co., New York City.
- 99,702. The words **TIRE RATE BOOK STANDARD TELEGRAPHIC CODE**—a section of a periodical which is issued three times yearly. The Class Journal Co., New York City.
- 100,104. The word **TITEXKOTE**—overcoats. United States Rubber Co., New York City.
- 100,106. The word **BUSTEKKOTE**—Same.
- 100,107. The word **KARTERKOTE**—Same.
- 100,111. The word **KASTERKOTE**—Same.
- 100,112. The word **KLEVERKOTE**—Same.
- 100,113. The word **KRAUTKOTE**—Same.
- 100,118. The word **KASTLEKOTE**—Same.
- 100,119. The word **KARTONKOTE**—Same.
- 100,121. The word **KALDWELLKOTE**—Same.
- 100,122. The word **KIPPERKOTE**—Same.
- 100,127. The word **KIPPERKOTE**—Same.
- 100,131. The word **KLUBBYKOTE**—Same.
- 100,134. The word **KARSLEYKOTE**—Same.
- 95,395. The words **SILVER KING**—golf balls. The India-Rubber Gutta Percha & Telegraph Works Co., Limited, London, England.
- 97,616. The word **PERMA-LOC**—non-adhesive patches for the inner tubes of automobile tires. E. A. Conroy, Wilkes-Barre, Pa., assignor to Permaloc Manufacturing Co.
- 97,834. The word **FLEXITE**—flexible rubber and composition disks for use as a universal joint member. F. R. Blair & Co., Inc., New York City.
- 98,711. A representation of an automobile wheel, with the word **EVERLOC** thereon—non-adhesive patches for repairing inner tubes and tire casings and other rubber goods. W. C. Wood, Minneapolis, Minn.
- 99,790. The word **GRYPHON**—rubber tires. Gryphon Rubber & Tire Corporation, New York City.
- 99,854. The word **MALCO**—rubber pneumatic automobile tires. P. S. Malickson, Philadelphia, Pa.

THE UNITED KINGDOM.

- 375,960. The word **NETTLE**—rubber insulated electric cables. Callenders Cable & Construction Co., Limited, Hamilton House, Victoria Embankment, London, E. C.
- 373,888. The words **REVOLITE DRI-SOLE**—soles and heels of artificial leather. The Revolite Co., Limited, Cambridge Street Rubber Mills, Cambridge street, Bradford Road, Manchester.
- 373,195. Representation of a rope shank rubber heel for boots and shoes. Plymouth Rubber Co., Canton, Mass.
- 376,073. Representation of a man—rubber goods. The North British Rubber Co., Limited, Castle Mills, Fountainbridge, Edinburgh, Scotland.

NEW ZEALAND

- 13,473. An illustration of a black cat—rubber heels. Foster Rubber Co., Boston, Massachusetts, U. S. A.
- 13,523. The words **GOLD BOND**—inflatable rubber tubes for use with rubber tires. The Fisk Rubber Co. of New York, Chicopee Falls, Massachusetts, U. S. A.
- 13,525. An illustration of a child dressed in sleeping garments, holding a tire in one hand, in the other a lighted candle, underneath is written the words **TIME TO RE-TIRE?** and **(BUY FISK)**—goods manufactured from rubber and gutta percha not included in other classes. The Fisk Rubber Co. of New York, Chicopee Falls, Massachusetts, U. S. A.

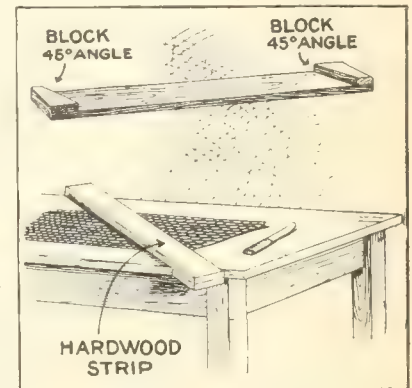
THE DOMINION OF CANADA.

- 22,041. The word **WELDACUT**—a composition made either wholly or partly of rubber or in which rubber is a component part, such composition to be used for the sealing of small cuts in tires, tubes and other rubber goods. Gutta Percha & Rubber, Limited, Toronto, Ontario.
- 22,065. The word **PIONEER**—suspenders, garters, belts and armbands. Pioneer Suspender Co., Philadelphia, Pa.
- 22,072. The word **TIREOID**—composition for sealing punctures in pneumatic tires. The Tireoid Co., Chicago, Ill.

22,082. The word **TENAX**—substance composed wholly or partly of rubber or in which rubber or rubber substitutes are component parts, such substance to be used principally for soles and heels in connection with both leather and rubber footwear of all kinds, and as a substitute for leather soles and heels. Gutta Percha & Rubber Co., Limited, Toronto, Ontario.

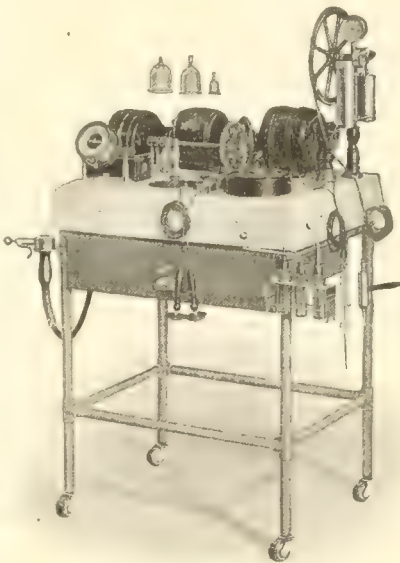
A HOME-MADE BIAS CUTTER.

In the Goodyear Tire & Rubber Co.'s repair school at Akron, Ohio, cutting fabric on the bias is done with a wet knife instead of with shears. A straight edge like the one shown in the illustration, with blocks that have 45-degree edges nailed to either end, is used. These edges even up against the edge of the table and secure a perfect 45-degree cutting angle. The device is simple, but very effective. The hardwood strip which forms the straight edge for cutting can be made in a few minutes by any repairman.



McINTOSH UNIVERSAL MODE.

As the name indicates, this apparatus can perform various functions. It is designed to take the place of separate electrical equipment for the many tasks performed by motors in a physician's work, such as running an air compressor, driving a generator to produce galvanic current, generating a sinusoidal current, delivering cautery current, operating vibrators, etc. By turning the knob of a cleverly devised dial selector, the particular form of current desired is instantly placed in service.



The rubber-tired wheel shown in the illustration is keyed to the rotor shaft and by turning a crank at the end of the rotor shaft which controls a threaded rod engaging this wheel, its position against the friction cone adjusts the frequency of the sinusoidal and other slowly

pulsating waves. When the sinusoidal current is not desired, useless wear on these frictional contacts can be eliminated by means of an adjustable hub on the motor shaft which throws the friction gear out of service.

This all-in-one apparatus provides a simple, complete and durable outfit for the medical practitioner and it is claimed to be the most economical apparatus for the purposes it fulfills. [McIntosh Battery & Optical Co., Chicago, Illinois.]

B. H. V. Barnard, deputy Conservator of Forests, at Perak, Federated Malay States, has contributed a very comprehensive article on gutta percha in the November, 1916, number of the Agricultural Bulletin. Another article on coagulation of latex in the presence of sugars tells of the investigations of Doctors Gurter and Swart of the West Java Testing Station.

Review of the Crude Rubber Market.

Copyright 1917.

NEW YORK.

EARLY in February the unfavorable shipping situation that prevailed was followed by the announcement of Germany's submarine blockade, causing grave uncertainty in the crude rubber market. Spot stocks were undoubtedly low and the possible loss of rubber cargoes destined to America constituted a formidable threat. Consequently when the diplomatic break with Germany was reported, the market became very erratic and prices fluctuated violently. On February 5, First latex and Ribbed smoked sheet, spot, ranged from 86 to 88 cents, and April-June positions for both grades were quoted from 81 to 83 cents. Amber crépe, light, was 85 to 88 cents and Roll brown, spot, was 68 to 72 cents. Paras were also affected by the upward movement, Upriver fine, spot, being quoted 82-84 cents; Upriver coarse, 53 to 56 cents; Caucho ball, 54-55 cents and Cameta, 38 to 40 cents.

The market steadily advanced, supported by keen interest on the part of the manufacturers, who had evidently become apprehensive. The volume of dealers' business was noticeably large and general trading active. On February 15, First latex, spot, and Ribbed smoked sheet were 91½ cents, with April-June positions at 83½ cents. Paras were firm and in good demand, Upriver fine,

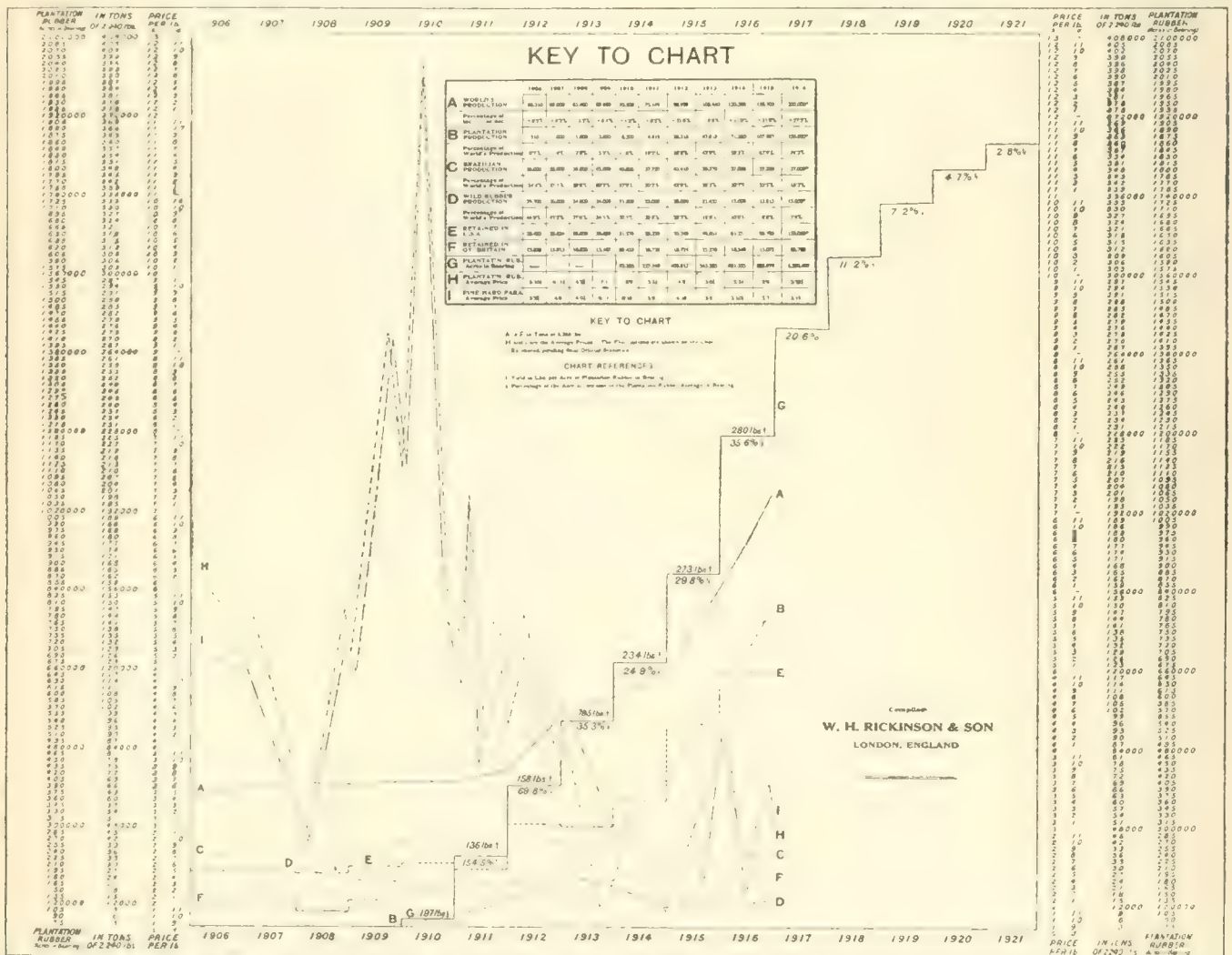
spot, being quoted 86 cents. Islands line was very scarce.

As time passed with no overt act on the part of Germany, and rubber continued to arrive in considerable volume, the market became easier and prices gradually declined. On February 27 market conditions were very quiet and prices varied widely, First latex and Ribbed smoked sheets being quoted 84 to 86 cents and Upriver fine, 80 cents.

According to statistics compiled by the Rubber Association of America the United States imports for the year ending December 31, 1916, were 115,609 tons, divided as follows: Plantations, 85,531 tons; Paras, 22,060 tons; Africans, 3,591 tons; Centrals, 1,768 tons; Guayule, 1,140 tons; Manicoba and the other sorts, 1,519 tons.

LONDON.

Early in the month there was a noticeable tendency on the part of buyers to hold off, resulting in a generally quiet market tone. First latex and Ribbed smoked sheet, spot, were quoted 75 cents to buyers on February 5, with July-December positions at 72 cents. The anxiety on the part of American buyers to provide against submarine contingencies created an active market and prices advanced. On February 15 the First latex and Ribbed



Graphic chart showing world's rubber production; plantation, Brazilian and wild rubber production; amount of rubber retained by the United States and Great Britain; acreage of plantation rubber in bearing; average prices of plantation and Para rubber; yield in pounds per acre and percentage of annual increase of plantation rubber in bearing.

smoked sheet spot price to buyers was 80 cents. Trading continued briskly until the American apprehension had subsided, when easier conditions prevailed and prices declined. On February 26, First latex and Ribbed smoked sheet were quoted 77½ cents.

SINGAPORE.

For the period from December 29, 1916, to January 4, 1917, inclusive, the value of the highest grade of rubber is fixed at 74 cents per pound, and the 2½ per cent ad valorem duty on cultivated rubber will be assessed on a price of 68 cents per pound for all grades.

The average prices obtained at the auctions held February 12, 17 and 22, are as follows: First latex crêpe, 66.1 cents; Ribbed smoked sheet, 65.6 cents. The total amount sold was 1,356 tons.

BATAVIA.

The exports of plantation rubber from the Dutch East Indies for 1915 were 20,100 tons. For the first six months of 1916 the exports were 15,121 tons, forecasting a total of 30,000 tons for 1916.

NEW YORK QUOTATIONS.

Following are the quotations at New York one year ago, one month ago and the current date:

PARA.	Mar. 1, '16.	Feb. 1, '17.	Feb. 27, '17.
Upriver, fine, new....	77 @ 78	77 @	79 @
Islands, fine, new....	70 @ 71	72 @	Nominal
Upriver, coarse, new....	59 @ 60	50 @	53½ @
Islands, coarse, new....	37 @ 38	31 @	35 @
Cametá	40 @ 41	32 @	38 @
Caucho, ball, upper....	61 @ 62	51 @	55 @
Caucho, ball, lower....	58 @ 59	49 @	51 @ 52

PLANTATION.

First latex crêpe ..	93 @ 94	{ Spot..... 75 @ 75½ Apr.-June 72 @	85 @
Amber crêpe, light ..	90 @	{ Spot..... 71 @ 72 Futures.....	83 @
Brown crêpe, clean ..	85 @	{ Spot..... 70 @ 71 Futures.....	81 @
Smoked sheet, ribbed..	92 @ 93	{ Spot..... 75 @ 75½ Apr.-June 72 @	85 @
Fine sheets and biscuits, unsmoked	91 @		

CENTRALS

Corinto	57 @ 59	49 @	52 @
Esmeralda, sausage ..	57 @ 59	47 @ 48	51 @
Nicaragua, scrap	56 @ 57	47 @	49 @
Mexican plantation, sheet	60 @	54 @ 56	.....
Mexican, scrap	53 @	46 @	51 @ 52
Mexican, slab	38 @ 40	31 @	35 @
Manicoba	50 @ 52½	42 @	32 @
Mangabeira, sheet	42 @ 45	40 @	32 @
Guayule	48 @	42 @ 44	56 @
Balata, sheet	66 @ 67	78 @ 78½	78 @
Balata, block	45 @ 46	64 @ 64½	65 @

AFRICAN

Lopori, ball, prime....	.....	65 @	.....
Lopori, strip, prime....	59 @	.....	65 @
Upper Congo, ball, red	62 @	.....	57 @
Rio Nunez Niggers....	72 @ 73	62 @ 63	68 @
Conakry Niggers	74 @ 75	60 @ 62	66 @
Massai, red	74 @ 75	60 @	65 @
Soudan, Niggers .....	.....	.....	65 @
Cameroon, ball, soft...	46 @	.....	47 @
Cameroon, ball, hard..	50 @	.....	.....
Benguela, No. 2, Superior	46 @ 48	44 @	47 @
Benguela, No. 2.....	.....	41 @	44 @
Accra, flake	38 @ 40	30 @	32 @

EAST INDIAN

Assam	58 @	50 @	78 @
Pontianak	10 @ 10½	9¾ @	8¾ @
Gutta Siak	15 @ 16½	.....	.....
Gutta red Nigger.....	.....	22 @	23 @ 24
Borneo III	27½ @	.....	.....
Gutta Percha, red Macassa	1.50 @ 2.00	1.90 @	1.90 @ 3.50

COMPARATIVE NEW YORK PRICES FOR FEBRUARY.

In regard to the financial situation, Albert B. Beers (broker in crude rubber and commercial paper, No. 68 William street, New York) advises as follows:

"The demand for commercial paper during February has been fairly good on the whole, the best rubber names moving at 4½% per cent, and those not so well known 5½% @ 6 per cent, but during the early part of the month when the flurry was in the money market there was but little demand."

	1917.*	1916.	1915.
Upriver, fine	75 @ 87	73 @ 80	57 @ 61
Upriver, coarse	50 @ 57	52 @ 60	44 @ 48
Islands, fine	67 @ 80	67 @ 74	50 @ 54
Islands, coarse	31 @ 36	35 @ 38	28 @ 32
Cametá	34 @ 40	37 @ 40	30 @ 36

*Figured only to February 24.

MARKET CABLE SERVICE FROM SINGAPORE.

The following reports of the weekly auctions held at Singapore have been cabled by The Waterhouse Co., Limited:

Date.	Crêpe.	Smoked Sheet.	Tons Sold.	Market.
February 12.. cents.	65.87	65.45	603	Large business and prices strong.
February 17 ..	65.87	65.45	281	There is a fair demand for better grades.
February 23 ..	66.72	65.87	472	Good demand for all descriptions.

MARKET CABLE SERVICE FROM LONDON.

The following market report has been cabled from Aldens' Successors, Limited, London:

Date.	Standard Crêpe.	Ribbed Smoked Sheet.	Market.
February 5..... cents	74.24	74.24	There were buyers.
February 13	78.69	78.69	There were buyers.
February 19	78.69	78.69	There were buyers.

WEEKLY RUBBER REPORT.

GUTHRIE & CO., LIMITED, Singapore, report [December 29, 1916]: At the weekly auction held yesterday and today bidding was again stiff and all grades, except fine pale crêpe, suffered a decline averaging about \$4 per picul. At \$146 the top price for fine pale crêpe was \$4 up, but this figure was exceptional, the average being \$140 per picul. The highest paid for ribbed smoked sheet was \$137, being a drop of \$5 on the week. For unsmoked sheet there was no demand. The lower grades met with a better demand than last week at the lower level. The quantity sold was 393 tons, out of a total of 1,129 tons offered.

The following was the course of values:

	In Singapore per picul.*	Sterling equivalent per pound in London.	Equivalent per pound in cents.
Sheet, fine ribbed smoked...	\$130 @ 137	2/ 6¼ @ 2/ 8¼	55.25 @ 58.22
Sheet, good ribbed smoked...	125 @ 130	2/ 5¼ @ 2/ 6¼	53.12 @ 55.25
Sheet, plain smoked	115 @ 123	2/ 3½ @ 2/ 5½	48.87 @ 52.27
Sheet, ribbed unsmoked.....	.....	.....	.....
Sheet, plain unsmoked .....	.....	.....	.....
Crêpe, fine pale	136 @ 146	2/ 8 @ 2/ 10½	57.80 @ 62.05
Crêpe, good pale	125 @ 134	2/ 5¼ @ 2/ 7½	53.12 @ 56.95
Crêpe, fine brown	115 @ 120	2/ 3½ @ 2/ 4¾	48.87 @ 51.00
Crêpe, good brown	109 @ 115	2/ 2½ @ 2/ 3½	46.32 @ 48.87
Crêpe, dark	85 @ 110	1/ 9½ @ 2/ 2½	36.12 @ 46.75
Crêpe, bark	60 @ 101	1/ 4½ @ 2/ 0¾	25.50 @ 42.92
Scrap, virgin	86 @	1/ 9½ @	36.55 @
Scrap, pressed	84 @	1/ 9½ @	35.70 @
Scrap, loose	82 @	1/ 8¾ @	34.85 @

*Picul = 133½ pounds.

Quoted in S. S. dollars = 2/4 [56.7 cents].

PLANTATION RUBBER FROM THE FAR EAST.

TOTAL EXPORTS FROM MALAYA.

(From January 1, 1916, to dates named, excluding all foreign transshipments. Reported by Barlow & Co., Singapore.)

	Singapore.	Malacca.	Penang.	Port Swettenham.	Totals.
To--	October 31, 1916.	October 31, 1916.	October 31, 1916.	December 26, 1916.	
United Kingdom.. lbs.	26,854,341	6,376,557	21,416,167	28,007,373	82,654,338
The Continent	9,366,270	.....	55,733	.....	9,422,003
Japan	3,508,344	.....	.....	.....	3,508,344
Ceylon	604,283	.....	363,600	1,615,073	2,782,956
United States	69,509,518	.....	9,105,067	1,716,875	80,331,460
Australia	268,302	.....	.....	.....	268,302
Totals	110,110,958	6,376,557	31,140,567	31,339,321	179,020,523
Same period, 1915...	66,782,158	6,617,032	24,322,531	31,286,389	128,708,110
Same period, 1914...	32,919,222	4,108,376	20,009,367	28,877,774	85,914,739
Same period, 1913...	21,830,702	.....	12,925,467	20,254,269	55,010,438

FEDERATED MALAY STATES RUBBER EXPORTS.

It is reported by official cablegram from Kuala Lumpur that the export of plantation rubber from the Federated Malay States in the month of January amounted to 5,995 tons, compared with 5,717 tons in December last and 4,471 tons in the corresponding month last year.

EXPORTS OF CEYLON GROWN RUBBER

From January 1 to December 31, 1915 and 1916. Compiled by the Ceylon Chamber of Commerce.)

	1915	1916.
United States	18,193,395	25,667,293
France	593,532	1,769,327
Russia	332,200	293,674
Italy	164,640	164,640
United Kingdom	23,161,446	21,903,181
Australia	844,977	783,651
India	1,530	1,408
Straits Settlements	119,933	43,680
Japan	262,664	338,089

Totals

(Same period 1914, 34,888,617 pounds; same period 1913, 25,482,799.)
The export figures of rubber, given in the above table for 1914, include the imports reexported. (These amount to 2,844,398 pounds from the Straits Settlements and 819,574 pounds from India.) To arrive at the total quantity of Ceylon rubber exported for that year deduct these imports from the total exports. The figures for 1915 and 1916 are for Ceylon rubber only.

IMPORTS AND EXPORTS OF RAW RUBBER AT CEYLON.

IMPORTS.			
FROM NOV. 28 TO DEC. 31, 1916.			
From	Pounds.	From	Pounds.
Malay Peninsula		Seattle	69,456
Port Swettenham	166,371	Bombay	8,960
Penang	69,000		
Port Dickson	60,125	Europe:	
Singapore	31,065	United Kingdom	
Total	327,257	England	26,613
India		London	26,830
Tuticorin	181,627	Liverpool	1,819
Cochin	106,920	Manchester	
Alleppy	29,180	Total	1,131,262
Calcutta	572		
Total	318,299	ASIA:	
Burma—		Japan	8,960
Rangoon	37,524	Yokohama	3,911
Grand Total	683,080	Kobe	383
		India (Bombay)	
EXPORTS.			
FROM DECEMBER 1-31, 1916.			
To—		Total	13,254
North America:		Oceania:	
United States—		Australia	13,440
New York	929,481	Grand Total	1,157,956

STRAITS SETTLEMENTS RUBBER EXPORTS.

An official cablegram from Singapore gives the export of plantation rubber from Straits Settlements ports for the month of December last as 3,219 tons, including transshipments amounting to 768 tons. The figures for November were 5,247 tons and for December, 1915, 3,005 tons. The total export for the past year was 48,650 tons, compared with 34,891 tons in 1915 and 19,727 tons in 1914. The following are the comparative figures:

	1914.	1915.	1916.
January	1,181	2,576	4,443
February	1,703	2,741	3,359
March	1,285	2,477	4,481
April	1,548	1,978	4,219
May	1,309	3,588	3,274
June	1,480	2,249	3,836
July	1,584	2,324	5,106
August	1,525	2,295	3,246
September	1,602	4,725	2,987
October	2,006	2,641	5,233
November	2,870	4,285	5,217
December	2,334	3,005	3,219
Totals	19,727	34,891	48,650

These figures include transshipments of rubber from various places in the neighborhood of the Straits Settlements, such as Borneo, Java, Sumatra and the non-Federated Malay States as well as rubber actually exported from the Colony, but do not include rubber exports from the Federated Malay States.

IMPORTS AND EXPORTS OF RUBBER AND GUTTA AT SINGAPORE.

IMPORTS.

December, 1916.

From—	Para Rubber	Para Rubber for Treatment.	Borneo Rubber.	Gutta Percha.	Gutta Jelutong.
Malay Peninsula—					
Port Swettenham	2,410,266				
Teluk Anson	1,341,733				
Muar	1,068,266				
Penang	717,200	164,400			
Malacca	674,133	612,000			
Port Dickson	171,866	318,400			
Kelantan	134,400				
Kuantan	52,800				
Rengat	20,666	26,666			
Mersing	4,933				
Pahang	1,600				
S. Pandjang	1,466				
Tringganu	266				
Totals	6,599,595	1,121,466		133	

December, 1916.

From	Para Rubber	Para Rubber for Treatment.	Borneo Rubber.	Gutta Percha.	Gutta Jelutong.
Borneo—					
Sarawak	135,600	27,333	533	11,600	763,200
Bandjerassin	99,733	38,466	2,666	66,766	258,400
Pontianak	67,466		933	2,800	70,666
Sibu	66,133		1,733	16,800	189,200
Labuan	52,933			3,600	209,333
Tessellon	40,533	395,600		400	
Sambas	29,200				4,666
Sandakan	26,266	48,811			
Kudat	17,200	47,066	133	133	
Pasar	13,066				
Singawang	9,600				
Sampt	2,666		1,333	533	269,866
Samarinda	800		666	6,666	
Kunung	800				
Totals	561,996	557,276	7,997	109,298	1,765,331
Sumatra—					
Djambi	206,000				
Deli	93,066	508,533			
Palembang	40,533		1,866		203,066
Stak	5,333			1,600	
Muntok	4,400				
Bengkalis	2,400				
Indragiri	266				59,063
Belawan		217,466			
P. Bon	133		800		40,000
Asahan		64,666			
Totals	352,131	790,665	2,666	1,600	302,129
Java—					
Sourabaya	215,333				
Batavia	77,466				
Samarang	1,333			666	
Totals	294,132			666	
Siam—					
Bangkok	266			2,933	
Patani	133				
Total				2,933	
Burma—					
Rangoon	13,600				
Mergui	4,666				
Total	18,266				
Other ports	202,633	163,166	5,333	4,533	85,733
Grand Totals	8,029,152	2,632,573	15,996	119,163	2,153,193

EXPORTS.

December, 1916.

To—	Para Rubber	Para Rubber Trans-shipped.	Borneo Rubber.	Gutta Percha.	Gutta Jelutong.
NORTH AMERICA:					
United States—					
Akron	2,496,266	26,800			
New York	1,948,266	197,333		56,133	148,800
Seattle	500,533	23,733			
Boston	11,200				127,133
Canada—					
Ontario (Toronto)	92,133				
Totals	5,048,398	247,866		56,133	275,933
EUROPE:					
United Kingdom					
England					
London	651,200	2,172,133		136,666	116,933
Liverpool	105,333	177,333			19,733
Russia (Vladivostok)	1,673,066				
France (Marseilles)	88,000				
Italy (Genoa)	24,400				
Totals	2,543,199	2,349,466		136,666	136,666
Grand Totals	7,592,597	2,597,332		192,799	412,599

CRUDE RUBBER ARRIVALS AT THE PORT OF NEW YORK.

[The figures indicate Weight in Pounds.]

PARAS FROM BRAZIL.

JANUARY 29.—By the steamer *Tapajoz* from Pará:

	Fine.	Coarse.	Medium.	Cauchó.	Totals.
H. A. Astlett & Co.					199,350
Aldens' Successors, Ltd.				400	86,200
G. Amsinck & Co.					74,700
Meyer & Brown					180,450
General Rubber Co.					101,700
Arnold & Zeiss					147,600
W. R. Grace & Co.					6,750
Raw Products Co.					11,250
Muller, Schall & Co.					34,650
Neuss, Hesslein & Co.					198,900
E. T. Greiner					116,550
Various					540,900
Total					1,699,000

FEBRUARY 7.—By the steamer *Mamitowoc* from Montevideo:

A. D. Straus & Co.					2,700
Neuss, Hesslein & Co.	5,148				5,148
Total					7,848

	Fine.	Coarse.	Medium.	Caucho.	Totals.
FEBRUARY 8.—By the steamer <i>Ancon</i> from Cristobal:					
Neuss, Hesslein & Co.	6,800	700	—	—	7,500

FEBRUARY 10.—By the steamer <i>Zulia</i> from Curacao:					
G. Amsinck & Co.	—	—	—	—	232,650

FEBRUARY 13.—By the steamer <i>Tennyson</i> from Buenos Aires:					
Various (London & Brazilian Bank)	—	—	—	—	170,100

FEBRUARY 13.—By the steamer <i>Sergipe</i> from Rio de Janeiro:					
General Rubber Co.	56,000	22,200	6,400	—	84,600
W. R. Grace & Co.	—	—	—	3,500	3,500
Muller, Schall & Co.	91,200	15,000	71,040	4,000	181,240
Arnold & Zeiss	640	32,400	3,840	5,000	41,880
Konig Bros. & Co.	1,610	—	—	—	1,610
Baring Bros. & Co., Ltd.	52,480	—	2,560	10,500	65,540
Goldman, Sacks & Co.	—	—	—	3,500	3,500
Various	125,440	69,600	15,040	9,000	219,080
Total	—	—	—	—	600,950

FEBRUARY 13.—By the steamer <i>Maranhao</i> from Itacoatiara:					
Various	2,880	6,000	640	30,000	39,520

FEBRUARY 13.—By the steamer <i>Brazil</i> from Manaoas:					
Muller, Schall & Co.	—	—	—	—	90,000

	POUNDS.
CENTRALS.	
JANUARY 29.—By the <i>Manzanillo</i> =Acapulco:	
Bloom Bros.	1,540
JANUARY 29.—By the <i>Manzanillo</i> =Corinto:	
American Trading Co.	1,600
Various	1,500
JANUARY 29.—By the <i>Manzanillo</i> =San Juan Del Sur:	
G. Amsinck & Co.	5,800
Gontard & Co.	1,600
JANUARY 29.—By the <i>Tivives</i> =Puerto Cortez:	
Broedermann & Litzrodt	1,100
JANUARY 29.—By the <i>Tivives</i> =Puerto Barrios:	
W. R. Grace & Co.	200
A. Rosenthal & Sons	5,100
J. S. Sembrada & Co.	2,800
JANUARY 30.—By the <i>Calamaries</i> =Port Limon:	
A. A. Lindo & Co.	600
FEBRUARY 2.—By the <i>Carrillo</i> =Cartagena:	
G. Amsinck & Co.	14,700
Blanco & Co.	200
FEBRUARY 2.—By the <i>Carrillo</i> =Puerto Colombia:	
G. Amsinck & Co.	300
FEBRUARY 2.—By the <i>Philadelphia</i> =Puerto Cabello:	
American Trading Co.	800
FEBRUARY 6.—By the <i>Tenadores</i> =Port Limon:	
I. Brandon Bros.	400
FEBRUARY 6.—By the <i>Esperanza</i> =Vera Cruz:	
H. Marquardt & Co.	3,300
L. Johnson & Co.	3,960
U. S. Brokerage Co.	440
FEBRUARY 7.—By the <i>Colon</i> =Panama City:	
Fidanque Bros. & Sons	1,430
The Otto Gerdau Co.	10,340
I. Brandon & Bros.	110
Piza Nephews Co.	3,300
FEBRUARY 7.—By the <i>Colon</i> =Cristobal:	
G. Amsinck & Co.	9,240
Muller, Schall & Co.	7,480
Gontard & Co.	110
FEBRUARY 7.—By the <i>Maravel</i> =Paramaribo:	
Middleton & Co.	1,100
R. Dan Walterbeck	220
FEBRUARY 8.—By the <i>Ancon</i> =Cristobal:	
G. Amsinck & Co.	9,570
L. Johnson & Co.	10,890
Dumarest Bros.	1,540
Pablo Calvet & Co.	2,310
FEBRUARY 9.—By the <i>Santa Marta</i> =Cartagena:	
Andean Trading Co.	3,960
G. Amsinck & Co.	6,600
R. del Castillo & Cia.	330
A. Held	550
Cowdrey Co.	110
FEBRUARY 13.—By the <i>Metapan</i> =Port Limon:	
I. Brandon & Bros.	550
C. F. Hernandez Sons & Co.	220
FEBRUARY 13.—By the <i>Sixola</i> =Puerto Cortez:	
G. Amsinck & Co.	440
W. R. Grace & Co.	1,540

JANUARY 29.—By the <i>Manzanillo</i> =Acapulco:	
Bloom Bros.	1,540
JANUARY 29.—By the <i>Manzanillo</i> =Corinto:	
American Trading Co.	1,600
Various	1,500
JANUARY 29.—By the <i>Manzanillo</i> =San Juan Del Sur:	
G. Amsinck & Co.	5,800
Gontard & Co.	1,600
JANUARY 29.—By the <i>Tivives</i> =Puerto Cortez:	
Broedermann & Litzrodt	1,100
JANUARY 29.—By the <i>Tivives</i> =Puerto Barrios:	
W. R. Grace & Co.	200
A. Rosenthal & Sons	5,100
J. S. Sembrada & Co.	2,800
JANUARY 30.—By the <i>Calamaries</i> =Port Limon:	
A. A. Lindo & Co.	600
FEBRUARY 2.—By the <i>Carrillo</i> =Cartagena:	
G. Amsinck & Co.	14,700
Blanco & Co.	200
FEBRUARY 2.—By the <i>Carrillo</i> =Puerto Colombia:	
G. Amsinck & Co.	300
FEBRUARY 2.—By the <i>Philadelphia</i> =Puerto Cabello:	
American Trading Co.	800
FEBRUARY 6.—By the <i>Tenadores</i> =Port Limon:	
I. Brandon Bros.	400
FEBRUARY 6.—By the <i>Esperanza</i> =Vera Cruz:	
H. Marquardt & Co.	3,300
L. Johnson & Co.	3,960
U. S. Brokerage Co.	440
FEBRUARY 7.—By the <i>Colon</i> =Panama City:	
Fidanque Bros. & Sons	1,430
The Otto Gerdau Co.	10,340
I. Brandon & Bros.	110
Piza Nephews Co.	3,300
FEBRUARY 7.—By the <i>Colon</i> =Cristobal:	
G. Amsinck & Co.	9,240
Muller, Schall & Co.	7,480
Gontard & Co.	110
FEBRUARY 7.—By the <i>Maravel</i> =Paramaribo:	
Middleton & Co.	1,100
R. Dan Walterbeck	220
FEBRUARY 8.—By the <i>Ancon</i> =Cristobal:	
G. Amsinck & Co.	9,570
L. Johnson & Co.	10,890
Dumarest Bros.	1,540
Pablo Calvet & Co.	2,310
FEBRUARY 9.—By the <i>Santa Marta</i> =Cartagena:	
Andean Trading Co.	3,960
G. Amsinck & Co.	6,600
R. del Castillo & Cia.	330
A. Held	550
Cowdrey Co.	110
FEBRUARY 13.—By the <i>Metapan</i> =Port Limon:	
I. Brandon & Bros.	550
C. F. Hernandez Sons & Co.	220
FEBRUARY 13.—By the <i>Sixola</i> =Puerto Cortez:	
G. Amsinck & Co.	440
W. R. Grace & Co.	1,540

JANUARY 29.—By the <i>Manzanillo</i> =Acapulco:	
Bloom Bros.	1,540
JANUARY 29.—By the <i>Manzanillo</i> =Corinto:	
American Trading Co.	1,600
Various	1,500
JANUARY 29.—By the <i>Manzanillo</i> =San Juan Del Sur:	
G. Amsinck & Co.	5,800
Gontard & Co.	1,600
JANUARY 29.—By the <i>Tivives</i> =Puerto Cortez:	
Broedermann & Litzrodt	1,100
JANUARY 29.—By the <i>Tivives</i> =Puerto Barrios:	
W. R. Grace & Co.	200
A. Rosenthal & Sons	5,100
J. S. Sembrada & Co.	2,800
JANUARY 30.—By the <i>Calamaries</i> =Port Limon:	
A. A. Lindo & Co.	600
FEBRUARY 2.—By the <i>Carrillo</i> =Cartagena:	
G. Amsinck & Co.	14,700
Blanco & Co.	200
FEBRUARY 2.—By the <i>Carrillo</i> =Puerto Colombia:	
G. Amsinck & Co.	300
FEBRUARY 2.—By the <i>Philadelphia</i> =Puerto Cabello:	
American Trading Co.	800
FEBRUARY 6.—By the <i>Tenadores</i> =Port Limon:	
I. Brandon Bros.	400
FEBRUARY 6.—By the <i>Esperanza</i> =Vera Cruz:	
H. Marquardt & Co.	3,300
L. Johnson & Co.	3,960
U. S. Brokerage Co.	440
FEBRUARY 7.—By the <i>Colon</i> =Panama City:	
Fidanque Bros. & Sons	1,430
The Otto Gerdau Co.	10,340
I. Brandon & Bros.	110
Piza Nephews Co.	3,300
FEBRUARY 7.—By the <i>Colon</i> =Cristobal:	
G. Amsinck & Co.	9,240
Muller, Schall & Co.	7,480
Gontard & Co.	110
FEBRUARY 7.—By the <i>Maravel</i> =Paramaribo:	
Middleton & Co.	1,100
R. Dan Walterbeck	220
FEBRUARY 8.—By the <i>Ancon</i> =Cristobal:	
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L. Johnson & Co.	10,890
Dumarest Bros.	1,540
Pablo Calvet & Co.	2,310
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R. del Castillo & Cia.	330
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Cowdrey Co.	110
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C. F. Hernandez Sons & Co.	220
FEBRUARY 13.—By the <i>Sixola</i> =Puerto Cortez:	
G. Amsinck & Co.	440
W. R. Grace & Co.	1,540

JANUARY 29.—By the <i>Manzanillo</i> =Acapulco:	
Bloom Bros.	1,540
JANUARY 29.—By the <i>Manzanillo</i> =Corinto:	
American Trading Co.	1,600
Various	1,500
JANUARY 29.—By the <i>Manzanillo</i> =San Juan Del Sur:	
G. Amsinck & Co.	5,800
Gontard & Co.	1,600
JANUARY 29.—By the <i>Tivives</i> =Puerto Cortez:	
Broedermann & Litzrodt	1,100
JANUARY 29.—By the <i>Tivives</i> =Puerto Barrios:	
W. R. Grace & Co.	200
A. Rosenthal & Sons	5,100
J. S. Sembrada & Co.	2,800
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I. Brandon Bros.	400
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Gontard & Co.	110
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R. Dan Walterbeck	220
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L. Johnson & Co.	10,890
Dumarest Bros.	1,540
Pablo Calvet & Co.	2,310
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R. del Castillo & Cia.	330
A. Held	550
Cowdrey Co.	110
FEBRUARY 13.—By the <i>Metapan</i> =Port Limon:	
I. Brandon & Bros.	550
C. F. Hernandez Sons & Co.	220
FEBRUARY 13.—By the <i>Sixola</i> =Puerto Cortez:	
G. Amsinck & Co.	440
W. R. Grace & Co.	1,540

JANUARY 29.—By the <i>Manzanillo</i> =Acapulco:	
Bloom Bros.	1,540
JANUARY 29.—By the <i>Manzanillo</i> =Corinto:	
American Trading Co.	1,600
Various	1,500
JANUARY 29.—By the <i>Manzanillo</i> =San Juan Del Sur:	
G. Amsinck & Co.	5,800
Gontard & Co.	1,600
JANUARY 29.—By the <i>Tivives</i> =Puerto Cortez:	
Broedermann & Litzrodt	1,100
JANUARY 29.—By the <i>Tivives</i> =Puerto Barrios:	
W. R. Grace & Co.	200
A. Rosenthal & Sons	5,100
J. S. Sembrada & Co.	2,800
JANUARY 30.—By the <i>Calamaries</i> =Port Limon:	
A. A. Lindo & Co.	600
FEBRUARY 2.—By the <i>Carrillo</i> =Cartagena:	
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Blanco & Co.	200
FEBRUARY 2.—By the <i>Carrillo</i> =Puerto Colombia:	
G. Amsinck & Co.	300
FEBRUARY 2.—By the <i>Philadelphia</i> =Puerto Cabello:	
American Trading Co.	800
FEBRUARY 6.—By the <i>Tenadores</i> =Port Limon:	
I. Brandon Bros.	400
FEBRUARY 6.—By the <i>Esperanza</i> =Vera Cruz:	
H. Marquardt & Co.	3,300
L. Johnson & Co.	3,960
U. S. Brokerage Co.	440
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I. Brandon & Bros.	110
Piza Nephews Co.	3,300
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Muller, Schall & Co.	7,480
Gontard & Co.	110
FEBRUARY 7.—By the <i>Maravel</i> =Paramaribo:	
Middleton & Co.	1,100
R. Dan Walterbeck	220
FEBRUARY 8.—By the <i>Ancon</i> =Cristobal:	
G. Amsinck & Co.	9,570
L. Johnson & Co.	10,890
Dumarest Bros.	1,540
Pablo Calvet & Co.	2,310
FEBRUARY 9.—By the <i>Santa Marta</i> =Cartagena:	
Andean Trading Co.	3,960
G. Amsinck & Co.	6,600
R. del Castillo & Cia.	330
A. Held	550
Cowdrey Co.	110
FEBRUARY 13.—By the <i>Metapan</i> =Port Limon:	
I. Brandon & Bros.	550
C. F. Hernandez Sons & Co.	220
FEBRUARY 13.—By the <i>Sixola</i> =Puerto Cortez:	
G. Amsinck & Co.	440
W. R. Grace & Co.	1,540

JANUARY 29.—By the <i>Manzanillo</i> =Acapulco:	
Bloom Bros.	1,540
JANUARY 29.—By the <i>Manzanillo</i> =Corinto:	
American Trading Co.	1,600
Various	1,500
JANUARY 29.—By the <i>Manzanillo</i> =San Juan Del Sur:	
G. Amsinck & Co.	5,800
Gontard & Co.	1,600
JANUARY 29.—By the <i>Tivives</i> =Puerto Cortez:	
Broedermann & Litzrodt	1,100
JANUARY 29.—By the <i>Tivives</i> =Puerto Barrios:	
W. R. Grace & Co.	200
A. Rosenthal & Sons	5,100
J. S. Sembrada & Co.	2,800
JANUARY 30.—By the <i>Calamaries</i> =Port Limon:	

FEBRUARY 9.—By the <i>Mermaid</i> —London:		POUNDS.
M. Littlejohn & Co.	57,600	
L. Littlejohn & Co., Inc.	57,615	
Raw Products Co.	33,461	
Lee Goodyear Tire & Rubber Co.	291,488	
W. H. Stiles & Co.	15,300	
The Rubber Trading Co.	402,330	
Hagerover Trading Co.	102,676	
General R. B. Co.	235,845	
Lee Stiles & Co.	17,398	
Robinson & Co.	8,100	
Various	117,855	1,056,312

FEBRUARY 8.—By the <i>Ming Lo</i> —London:		POUNDS.
L. Littlejohn & Co.	118,800	
Rubber Trading Co.	22,680	
W. H. Stiles & Co.	112,000	
Michelin Tire Co.	57,645	
Goodyear Tire & Rubber Co.	429,975	
Fred. Stern & Co.	32,400	
Arnold & Zeiss	68,850	
Winter Sons & Co.	16,065	
G. R. Henke	14,985	873,400

FEBRUARY 13.—By the <i>New York</i> —Liverpool:		POUNDS.
Various		1,890

FEBRUARY 13.—By the <i>Feltrim</i> —London:		POUNDS.
Arnold & Zeiss	95,175	
Aldens' Successors, Ltd.	686,000	
Various	547,465	1,318,640

FEBRUARY 13.—By the <i>Kroonland</i> —Liverpool:		POUNDS.
Various		2,700

FEBRUARY 13.—By the <i>Andania</i> —Liverpool:		POUNDS.
United States Rubber Co.	13,770	
Various	12,285	26,055

FEBRUARY 13.—By the <i>Ascania</i> —London:		POUNDS.
I. T. Johnstone Co.	47,790	
W. R. Grace & Co.	47,115	
Various	294,110	389,015

FEBRUARY 13.—By the <i>Valencia</i> —Liverpool:		POUNDS.
The B. F. Goodrich Co.	21,330	
Philadelphia Rubber Works Co.	25,380	
Various	540	47,250

FEBRUARY 14.—By the <i>Carpathia</i> —Liverpool:		POUNDS.
Aldens' Successors, Ltd.	223,500	
W. H. Stiles & Co.	30,000	
Various	307,155	560,655

FEBRUARY 14.—By the <i>Waaldyk</i> —Sourabaya:		POUNDS.
L. Littlejohn & Co.	40,230	
General Rubber Co.	209,250	
G. Amsinck & Co.	63,990	
Raw Products Co.	47,854	
Hagemeyer Trading Co.	22,068	
Fred. Stern & Co.	2,240	
Various	117,982	503,614

FEBRUARY 14.—By the <i>Waaldyk</i> —Batavia:		POUNDS.
G. Amsinck & Co.	12,960	
L. Littlejohn & Co.	29,970	
General Rubber Co.	6,750	
Ned Escompte Co.	1,485	
Stein, Hirsch & Co.	73,845	
W. H. Stiles & Co.	11,200	
Various	923,675	1,059,885

FEBRUARY 15.—By the <i>Valacia</i> —London:		POUNDS.
Aldens' Successors, Ltd.	341,200	
L. Littlejohn & Co.	235,440	
The B. F. Goodrich Co.	235,035	
Michelin Tire Co.	88,830	
Charles T. Wilson Co., Inc.	65,610	
J. W. Johnstone & Co.	115,155	
W. R. Grace & Co.	372,600	
Edward Maurer & Co.	40,635	
Meyer & Brown	36,585	
Hagemeyer Trading Co.	17,721	
Leo Ratner	6,615	1,555,476

FEBRUARY 15.—By the <i>Bassano</i> —Hull:		POUNDS.
Robinson & Co.	12,015	
Robert Badenhop Co.	21,600	61,020

FEBRUARY 17.—By the <i>Buffalo</i> —Hull:		POUNDS.
Firestone Tire & Rubber Co.	28,890	
The Hagemeyer Trading Co.	12,989	
Robinson & Co.	41,715	
Meyer & Brown	27,810	
Robert Badenhop Co., Inc.	70,200	258,525

FEBRUARY 19.—By the <i>Launceston</i> —London:		POUNDS.
Hagemeyer Trading Co.	39,690	
Raw Products Co.	121,365	
United States Rubber Co.	519,750	
Michelin Tire Co.	65,610	
Robinson & Co.	27,945	
W. H. Stiles & Co.	13,400	
Various	29,800	817,560

FEBRUARY 19.—By the <i>Creue Hall</i> —Colomb:		POUNDS.
W. H. Stiles & Co.	33,600	
Hagemeyer Trading Co.	6,720	
Various	359,685	400,005

FEBRUARY 21.—By the <i>Orduna</i> —Liverpool:		POUNDS.
Various		55,080

FEBRUARY 21.—By the <i>Ansonia</i> —London:		POUNDS.
Aldens' Successors, Ltd.	336,500	
L. Littlejohn & Co.	219,240	
Michelin Tire Co.	111,240	
Leo Ratner	7,020	
Various	298,860	972,800

FEBRUARY 23.—By the <i>Philadelphia</i> —Liverpool:		POUNDS.
Various		1,080

BALATA.

FEBRUARY 7.—By the <i>Carroll</i> —Cartagena:		POUNDS.
G. Amsinck & Co.	4,600	
American Trading Co.	16,790	21,390

FEBRUARY 6.—By the <i>Fenafres</i> —Bocas Del Toro:		POUNDS.
Egerts & Heintzen	920	
H. Marquardt & Co.	3,450	
Gontard & Co.	1,650	17,040

FEBRUARY 7.—By the <i>Colin</i> —Panama City:		POUNDS.
Gontard & Co.	9,201	
Fidanque Bros. & Sons	25,070	
I. Brandon & Bros.	3,220	
Piza Nephews Co.	460	37,950

FEBRUARY 7.—By the <i>Colin</i> —Cristobal:		POUNDS.
Carlos Carbone, Jr.	11,040	
Pottberg, Ebeling & Co.	7,360	
M. A. de Leon & Co.	3,220	
Gontard & Co.	7,820	29,440

FEBRUARY 7.—By the <i>Maravel</i> —Ciudad Bolivar:		POUNDS.
American Trading Co.	11,880	
Yglesias, Lobo & Co.	4,680	
G. Williams & Wigmore	15,960	32,520

FEBRUARY 7.—By the <i>Maravel</i> —Demerara:		POUNDS.
Various		16,720

FEBRUARY 7.—By the <i>Maravel</i> —Paramaribo:		POUNDS.
Matheson & Co.	16,720	
R. Dan Walterbeck	5,720	22,440

FEBRUARY 7.—By the <i>Maravel</i> —Trinidad:		POUNDS.
Trinidad Shipping & Trading Co.	37,840	

FEBRUARY 15.—By the <i>Valacia</i> —London:		POUNDS.
H. A. Astlett & Co.	2,760	

FEBRUARY 15.—By the <i>Almante</i> —Cristobal:		POUNDS.
Gontard & Co.	4,370	
Mecke & Co.	9,200	13,570

FEBRUARY 15.—By the <i>Mayaro</i> —Ciudad Bolivar:		POUNDS.
Gaston, Williams & Wigmore	8,280	

FEBRUARY 15.—By the <i>Mayaro</i> —Paramaribo:		POUNDS.
R. Dan Walterbeck	460	

FEBRUARY 16.—By the <i>Almante</i> —Cartagena:		POUNDS.
American Trading Co.	15,410	
G. Amsinck & Co.	27,830	43,240

FEBRUARY 21.—By the <i>Panama</i> —Cristobal:		POUNDS.
Pablo Calvet & Co.	11,730	
G. Amsinck & Co.	7,130	
I. Brandon & Bros.	5,980	
Gontard & Co.	5,060	
Fidanque Bros. & Sons	14,490	
Pottberg, Ebeling & Co.	12,880	
Pan-American Hide Co.	1,150	
M. A. de Leon & Co.	11,500	69,920

PONTIANAK.

FEBRUARY 6.—By the <i>Pleades</i> —Singapore:		POUNDS.
L. Littlejohn & Co.	108,750	
Robinson & Co.	107,250	
W. Brandt's Sons	85,000	
Hagemeyer Trading Co.	112,000	
Various	341,750	754,750

FEBRUARY 14.—By the <i>Waaldyk</i> —Batavia:		POUNDS.
E. Everett Carleton	33,600	
Various	57,600	91,200

GUTTA PERCHA.

FEBRUARY 6.—By the <i>Pleades</i> —Singapore:		POUNDS.
W. Brandt's Sons	7,250	

FEBRUARY 13.—By the <i>Tsushima Maru</i> —Manila:		POUNDS.
Busk & Daniels	5,100	

RUBBER SCRAP.

JANUARY 30.—By the <i>Collingham</i> —Havre:		POUNDS.
H. Muehlstein & Co.	7,040	

FEBRUARY 2.—By the <i>Penmorvah</i> —Havre:		POUNDS.
H. Muehlstein & Co.	9,840	
Maison, Lazarus	6,600	16,440

FEBRUARY 2.—By the <i>Bovic</i> —Manchester:		POUNDS.
Pequanno Rubber Co.	8,160	
Gutta Percha Rubber Mfg. Co.	4,480	
Rubber Regenerating Co.	6,720	
Manhattan Rubber Co.	160	
H. Muehlstein & Co.	2,400	
United States Rubber Reclaiming Co.	29,600	
Various	2,400	53,920

FEBRUARY 7.—By the <i>Colin</i> —Panama City:		POUNDS.
I. Brandon & Bros.	320	

FEBRUARY 7.—By the <i>Saratoga</i> —Havana:		POUNDS.
H. Muehlstein & Co.	5,440	
Yglesias, Lobo & Co.	17,720	20,160

FEBRUARY 7.—By the <i>Clare</i> —Buenos Aires:		POUNDS.
H. Muehlstein & Co.	220,000	

FEBRUARY 7.—By the <i>Mongoha</i> —London:		POUNDS.
H. Muehlstein & Co.	72,300	

FEBRUARY 9.—By the <i>Mesaba</i> —London:		POUNDS.
H. Muehlstein & Co.	26,720	
Various	29,600	56,320

FEBRUARY 13.—By the <i>Feltrim</i> —London:		POUNDS.
Various		148,800

FEBRUARY 13.—By the <i>Ascania</i> —London:		POUNDS.
Rubber Regenerating Co.	32,000	
Various	34,400	66,400

FEBRUARY 14.—By the <i>Havana</i> —Havana:		POUNDS.
Yglesias, Lobo & Co.	5,400	

FEBRUARY 17.—By the <i>Valacia</i> —London:		POUNDS.
United States Rubber Reclaiming Co.	5,840	
H. Muehlstein & Co.	61,280	
Joseph Chalfin	38,400	
Various	16,640	120,160

FEBRUARY 15.—By the <i>Mayaro</i> —Paramaribo:		POUNDS.
American Trading Co.	3,200	
Bees & Co.	160	3,360

FEBRUARY 17.—By the <i>Havre</i> —Havre:		POUNDS.
Muehlstein & Co.	10,080	
Leopold Lazarus Co.	21,920	32,000

FEBRUARY 19.—By the <i>Tolia</i> —Avonmouth:		POUNDS.
H. Muehlstein & Co.	37,920	
Joseph Chalfin	116,320	154,240

FEBRUARY 19.—By the <i>Lancastrian</i> —London:		POUNDS.
H. Muehlstein & Co.	31,520	
Various	14,240	45,760

FEBRUARY 19.—By the <i>Frankes</i> —Ceara:		POUNDS.
Various		5,600

FEBRUARY 19.—By the <i>Monterey</i> —Vera Cruz:		POUNDS.
Graham, Hinkley & Co.	1,600	

FEBRUARY 20.—By the <i>Tagus</i> —Colon:		POUNDS.
Various		7,840

FEBRUARY 21.—By the <i>Saratoga</i> —Havana:		POUNDS.
Gontard & Co.	9,440	
Yglesias, Lobo & Co.	6,400	15,840

FEBRUARY 21.—By the <i>Ansonia</i> —London:		POUNDS.
Trenton Scrap & Rubber Supply Co.	19,040	
H. Muehlstein & Co.	29,120	
Various	12,480	60,640

FEBRUARY 21.—By the <i>Panama</i> —Cristobal:		POUNDS.
E. Bers & Co.	4,800	
J. A. del Solar	15,360	20,160

CRUDE RUBBER ARRIVALS AT SEATTLE.

[Consignment is given first. Figured 135 pounds net to the case.]

PLANTATION.
TO SEATTLE.

JANUARY 29.—By the <i>Protestants</i> —Hongkong:		POUNDS.
W. R. Grace & Co.	37,800	
Goodyear Tire & Rubber Co.	122,445	
Arnold & Zeiss	10,395	170,640

FEBRUARY 6.—By the <i>Shizuka Maru</i> —Yokohama:		POUNDS.
W. R. Grace & Co.	1,080	

FEBRUARY 6.—By the <i>Princess Adelaide</i> —Vancouver, B. C.:		POUNDS.
Goodyear Tire & Rubber Co.	9,720	

FEBRUARY 19.—By the <i>Kamakura Maru</i> —Yokohama:		POUNDS.
Goodyear Tire & Rubber Co.	2,025	
W. R. Grace & Co.	1,890	3,915

TO NEW YORK.

JANUARY 29.—By the *Protesilaus*—Hongkong.

	POUNDS.
Arnold & Zeiss.....	40,500
United States Rubber Co.....	388,665
East Asiatic Co.....	10,395
Goodyear Tire & Rubber Co....	8,100
W. R. Grace & Co.....	35,775
J. T. Johnstone Co.....	7,695
Arthur Meyer & Co.....	3,240

FEBRUARY 2. By the *Mexico Maru*—Yokohama:

Goodyear Tire & Rubber Co.....	16,335
Henderson & Korn.....	87,750

FEBRUARY 8. By the *Hawaii Maru*—Yokohama:

Henderson & Korn.....	270
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FEBRUARY 20.—By the *Chicago Maru*—Yokohama:

Henderson & Korn.....	82,890
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TO AKRON.

JANUARY 29. —By the *Protesilaus*—Hongkong:

Goodyear Tire & Rubber Co....	322,245
Firestone Tire & Rubber Co....	49,815
J. T. Johnstone & Co.....	155,250

FEBRUARY 2.—By the *Mexico Maru*—Yokohama:

Goodyear Tire & Rubber Co.....	10,530
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FEBRUARY 8.—By the *Hawaii Maru*—Yokohama:

Goodyear Tire & Rubber Co.....	11,070
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FEBRUARY 19.—By the *Kamakura Maru*—Yokohama:

Goodyear Tire & Rubber Co.....	112,860
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FEBRUARY 20.—By the *Chicago Maru*—Yokohama:

The B. F. Goodrich Co.....	481,005
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CUSTOM HOUSE STATISTICS.

PORT OF NEW YORK—DECEMBER, 1916.

IMPORTS:	POUNDS.	VALUE.
India rubber	21,707,623	\$11,652,201
Balata	328,784	168,675
Gutta percha	132,596	14,836
Gutta jelutong (Pontianak)	457,032	22,259
Manufactures of india rubber	22,163	
Totals	22,626,035	\$11,880,134

EXPORTS:

India rubber	11,096	\$7,989
Balata	99,385	54,099
Rubber scrap	199,225	24,208
Reclaimed rubber	22,521	3,600
India rubber boots.....pairs	43,947	122,734
India rubber shoes.....pairs	82,495	41,301
Automobile tires	829,179	
Other rubber tires.....	103,115	
Belting, hose, etc.....	204,157	
All other rubber manufactures	363,507	
Total		\$1,753,889

PORT OF NEW YORK—JANUARY, 1917.

IMPORTS:	POUNDS.	VALUE.
India rubber	28,740,291	\$15,434,943
Balata	310,677	150,864
Gutta percha	240,241	21,071
Gutta jelutong (Pontianak)	2,921,461	127,475
Manufactures of india rubber	28,734	
Totals	32,212,670	\$15,763,087

EXPORTS:

	POUNDS.	VALUE.
India rubber	169,619	\$88,684
Balata	118,547	67,767
Rubber scrap	89,958	7,553
Reclaimed rubber	9,273	1,726
India rubber boots.....pairs	11,241	28,886
India rubber shoes.....pairs	137,391	63,051
Automobile tires		834,295
Other rubber tires.....		686,762
Belting, hose, etc.....		209,280
All other rubber manufactures		505,238
Total		\$2,493,242

PORT OF SAN FRANCISCO—DECEMBER, 1916.

IMPORTS:

India rubber	497,775	\$280,052
Rubber scrap	3,005	190
Manufactures of india rubber		266
Totals	500,780	\$280,508

EXPORTS:

India rubber boots.....pairs	672	\$2,142
India rubber shoes.....pairs	12,799	10,080
Automobile tires		\$70,468
Other rubber tires.....		9,540
Belting, hose, etc.....		22,266
All other rubber manufactures		13,110
Total		\$127,606

RUBBER STATISTICS FOR THE UNITED STATES.

IMPORTS OF CRUDE AND MANUFACTURED RUBBER.

UNMANUFACTURED free	1915.		1916.	
	Pounds.	Value.	Pounds.	Value.
India rubber:				
From:				
France	290,446	\$134,073	652,206	\$362,372
Germany	6,987	843		
Portugal	4,351,835	1,539,939	1,273,530	563,833
United Kingdom	87,244,979	47,566,344	58,157,721	39,414,267
Central America and British Honduras.....	1,243,476	549,101	1,249,656	573,046
Mexico	1,761,911	660,648	2,545,095	1,053,054
Brazil	51,473,477	21,422,230	49,281,838	24,589,208
Other South America.....	5,949,524	2,519,091	5,515,102	2,616,518
East Indies	63,910,104	33,712,497	140,832,273	90,155,040
Other countries	5,219,182	2,926,378	582,784	418,137
Totals	221,481,921	\$111,031,144	270,090,205	\$159,745,475
Balata	2,302,684	864,694	2,748,207	1,265,896
Guayule gum	4,966,464	1,445,453	2,537,167	693,251
Gutta jelutong	21,230,028	979,786	24,792,820	1,236,502
Gutta percha	2,231,246	258,948	3,176,010	349,727
Totals	252,212,343	\$114,580,025	303,344,409	\$163,290,851
Rubber scrap	12,342,117	877,026	16,084,653	1,226,157
Totals, unmanufactured	264,554,460	\$115,457,051	319,429,062	\$164,517,008
Chicle	7,916,893	\$2,903,018	7,250,336	\$3,198,153
MANUFACTURED—dutiable:				
Gutta percha		\$6,266		\$180,006
India rubber		445,255		486,333
Totals, manufactured		\$451,521		\$666,339
Substitutes—elasticon, etc.		19,334		18,662

EXPORTS OF DOMESTIC MERCHANDISE.

MANUFACTURED—	1915.		1916.	
	Pounds.	Value.	Pounds.	Value.
Automobile tires:				
To:				
†Russia in Europe.....				\$944,261
England		\$6,698,584		5,682,305
Canada		1,185,930		897,212
Mexico		152,578		227,981
Cuba		356,903		805,471
Australia		563,639		1,675,343
New Zealand				982,154
Philippine Islands		292,735		434,551
Other countries		2,168,283		3,562,665
Totals		\$11,418,652		\$15,211,943
All other tires.....		1,993,262		2,517,065
Belting hose and packing		2,002,847		3,530,219
Rubber boots.....pairs		548,706		1,593,046
Rubber shoes.....pairs		2,098,327		1,486,705
Scrap and old rubber.....		3,123,395		392,977
Reclaimed rubber		6,196,424		5,390,695
Other rubber manufactures				807,777
Totals, manufactured		\$24,412,892		\$33,934,348
Fountain pens.....number	200,637	\$205,225	251,662	\$147,587

EXPORTS OF FOREIGN MERCHANDISE.

UNMANUFACTURED	1915.		1916.	
	Pounds.	Value.	Pounds.	Value.
Balata	784,360	\$307,479	922,301	\$389,288
Guayule gum	47,391	16,701		
Gutta jelutong	2,773	305	56,000	2,520
Gutta percha	63,637	12,466	2,383	2,095
India rubber	4,664,095	2,357,350	9,179,017	5,330,100
Rubber scrap and refuse	12,687	1,107		
Totals, unmanufactured	5,574,943	\$2,695,408	10,159,701	\$5,724,003
Chicle	463,589	\$156,285	489,029	\$168,356
EXPORTS OF RUBBER GOODS TO NON-CONTIGUOUS TERRITORIES OF THE UNITED STATES.				
MANUFACTURED—	1915.		1916.	
	Quantity.	Value.	Quantity.	Value.
To—				
Alaska:				
Belting, hose and packing		\$123,745		\$120,719
Boots and shoes.....pairs	65,013	183,347	94,952	227,059
Other rubber goods.....		26,377		47,556
Totals	65,013	\$333,469	94,952	\$395,334
To—				
Hawaii:				
Belting, hose and packing		\$78,087		\$81,998
Automobile tires		447,469		593,777
Other tires		58,368		92,686
Other rubber goods.....		70,096		130,939
Totals		\$654,020		\$899,400
To—				
Philippine Islands:				
Belting, hose and packing		\$50,765		\$65,170
Boots and shoes.....pairs	37,412	34,484	172,202	122,762
Tires		363,657		496,925
Other rubber goods.....		151,799		217,170
Totals	37,412	\$600,710		\$902,027
To—				
Porto Rico:				
Belting, hose and packing		\$34,676		\$46,723
Automobile tires		313,429		537,296
Other tires		27,326		22,950
Other rubber goods.....		66,097		98,138
Totals		\$441,528		\$705,107

* Dutiable beginning July 1, 1916.

† Not separately stated prior to January 1, 1916.

IMPORTS AND EXPORTS OF CRUDE AND MANUFACTURED RUBBER AT THE PORT OF NEW YORK.

IMPORTS.

Week Ending	India Rubber.		Scrap or Re-manufacture.		Balata.		Gutta Percha.		Gutta Jelutong.	
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
January 12, 1917.	8,088,047	\$4,311*	668,087	\$49,823	137,959	\$68,310	200,303	\$16,854	.....	.....
January 26, 1917.	5,814,891	2,324*	255,895	17,482	33,949	14,585	.....	.....	.....	.....
February 2, 1917.	6,758,017	1,597*	353,401	25,689	35,874	14,606	22,188	2,651	254,996	\$10,337
February 9, 1917.	1,299,817	3,609*	151,155	9,360	69,760	29,450	.....	.....	983,353	43,117
February 16, 1917.	2,401,650	1,471,813	48,623	6,177	81,668	43,403	6,177	838	90,186	3,919

* Manufactures of India Rubber.

In addition to the above, 2,880 pounds of chicle was imported, valued at \$1,140; and substitutes for India Rubber valued at \$397.

EXPORTS.

FIGURES ISSUED FROM JANUARY 6 TO FEBRUARY 23, 1917.

EXPORTED TO	Belting, Hose and Packing.	Footwear.		Tires.		Insulated Wire and Cables.	Other mnf. of India Rubber.	Fountain Pens.	Chewing Gum.	Reclaimed Rubber.	Scrap Rubber.
		Boots.	Shoes.	Auto.	Other.						
NORTH AMERICA											
Bermuda	\$39		\$113			\$146	\$333	\$7	\$154		
British Honduras	117						18				
Central American States											
Costa Rica	120			\$161	\$150	747	482		229		
Guatemala	29			2,295	4	98	1,598		856		
Honduras	549			146	7		102		40		
Nicaragua	14		162			30	619				
Panama	3,643	\$485	400	5,458	5,328	4,958	3,080	194	1,626		
Salvador	2,846			1,017	1,339	59	1,986				
Mexico	13,102			13,629	969	7,982	8,984	66	277		
Moreton							26				
Newfoundland		6,267	249	444	73	5,241	1,887		603		
West Indies											
British											
Barbados	13	25	22	939			23				
Jamaica	265	55	31	6,943	3,659	270	406		64		
Trinidad and Tobago	375		16	2,002	71	517	376	2			
Other British	1,095		37	560	114	135	348	7	12		
Cuba	18,301	361	39	42,228	5,574	33,548	25,262	2,987	4,461		
Danish	4			103			146		6		
Dutch	33		15	1,372	89	203	103	26			
French	193	6		3,317		42	202	36	1		
Haiti	78			55	73		764		49		
Santo Domingo	513		44	3,399	290	1,226	1,292	3	321		
Totals, North America	\$41,319	\$7,199	\$1,128	\$83,068	\$17,740	\$55,286	\$48,037	\$3,328	\$8,699		
EUROPE											
Azores Islands						\$25					
Denmark	\$177	\$456	\$3,797	\$4,340			\$1,972				
France	11,045	180	3,124	105,847	\$88,931	230,849	165,707		\$1,531	\$1,249	
Greece				31,000					964		
Italy	303				7,046		850	\$334			
Netherlands			4,056	1,545		19,585	645				
Norway	884		1,843	98		11,957	1,592				
Portugal						1,801	184	367	50		
Spain	170			284	3,793	2,936	2,294	184			
Sweden						8,046					
Switzerland			496			310	617				
United Kingdom—											
England	36,870	321	30,403	153,370	51,155	7,046	161,787		28,880		
Scotland	5,198						148				29,313
Totals, Europe	\$54,647	\$957	\$43,719	\$296,444	\$150,925	\$347,555	\$335,796	\$885	\$31,425	\$1,249	\$29,313
SOUTH AMERICA											
Argentina	\$5,094		\$21,366	\$35,194	\$3,144	\$5,727	\$12,658		\$84		
Bolivia	50			84			6				
Brazil	4,964	\$183	18,184	30,424	596	48,730	13,046	\$873	40		
Chile	33,885	988	1,039	8,614		9,269	12,017	9			
Colombia	2,514	102	412	1,557	260	4,367	2,669	11			
Ecuador	307			640		2,068	2,250		36		
Guiana—			353		170		383		1		
Dutch	410		168	1	85		3				
Peru	1,067	219		4,615		6,770	10,787	80	192		
Uruguay	1,706		722	4,509	159	1,611	2,471				
Venezuela	3,110		19	5,239	1,312	2,595	4,844		50		
Totals, South America	\$52,167	\$1,492	\$42,763	\$110,937	\$5,716	\$81,137	\$61,134	\$973	\$403		
ASIA											
China	\$794					\$13,842	\$1,214		\$53		
British India	2,238			\$2,597		1,594	868	\$221			
Straits Settlements			\$574	2,146	\$660		67				
Dutch East Indies	5,947		468	10,643	365	10,580	3,355				
Hongkong					21		27		100		
Japan						13,703	1,697			\$408	
Korea	5,717						71				
Totals, Asia	\$14,606		\$1,042	\$15,386	\$1,046	\$45,719	\$7,990	\$221	\$153	\$408	
OCEANIA											
British—											
Australia and Tasmania	\$1,261		\$1,302	\$1,224		\$3,666	\$2,798		\$3,240		
New Zealand	38	\$842	276	9,712		1,745	453				
Philippine Islands	865		4,196	292		3,358	9,684		3,471		
British Oceania					\$66						
Totals, Oceania	\$2,164	\$842	\$5,774	\$11,228	\$66	\$8,769	\$12,935		\$6,711		
AFRICA											
British Africa—											
West				\$285			\$8				
South	\$20,982	\$3,285		34,991	\$6,303	\$278	1,972		\$79		
East				2,894							
French Africa				65							
Madagascar	215										
Portuguese Africa	325						31				
Totals, Africa	\$21,522	\$3,285		\$38,235	\$6,303	\$278	\$2,011		\$79		

In addition to the above the following items were exported during the same period: To England—Balata, \$60,582; India Rubber, \$87,474; to Japan—Balata, \$1,840.

EXPORTS OF INDIA RUBBER FROM MANAOS DURING JANUARY, 1917.

EXPORTERS.	EUROPE.					NEW YORK.					GRAND TOTALS.
	Fine.	Medium.	Coarse.	Caucho.	TOTALS.	Fine.	Medium.	Coarse.	Caucho.	TOTALS.	
General Rubber Co. of Brazil, kilos	221,917	27,510	8,761	51,812	310,000	89,009	22,006	39,424	33,661	185,000	495,000
Tancredo Porto & Co.	111,640	6,080	.....	14,280	132,000	71,645	32,860	47,409	22,086	174,000	306,000
Stowell & Co.	115,252	10,436	399	26,057	152,144	24,490	2,782	24,838	20,772	72,882	225,026
Ohliger & Co.	.....	.....	.....	.....	.....	113,685	7,481	23,466	37,750	182,382	182,382
J. G. Araujo	33,380	1,280	.....	.....	34,660	104,458	10,400	28,019	142,877	177,537	177,537
Adelbert H. Alden, Limited.	95,650	1,085	.....	27,338	124,073	.....	1,979	7,877	.....	9,856	133,929
G. Fradelizi	21,120	.....	.....	.....	21,120	.....	.....	.....	.....	.....	21,120
S. A. Armazens Andresen.	.....	.....	.....	.....	.....	17,095	.....	.....	.....	17,095	17,095
Mesquita & Co.	320	126	594	100	1,140	.....	.....	.....	.....	.....	1,140
Levy, Camille & Co.	.....	.....	1,020	30	1,050	.....	.....	.....	.....	.....	1,050
In transit, Iquitos	599,279	46,517	10,774	119,617	776,187	421,282	77,508	171,033	114,269	784,092	1,560,279
	27,547	2,286	13,605	36,714	80,152	13,200	1,631	6,166	16,299	37,296	117,448
Totals	626,826	48,803	24,379	156,331	856,339	434,482	79,139	177,199	130,568	821,388	1,677,727

EXPORTS OF INDIA RUBBER FROM MANAOS DURING 1916.

EXPORTERS.	EUROPE.					NEW YORK.					GRAND TOTALS.
	Fine.	Medium.	Coarse.	Caucho.	TOTALS.	Fine.	Medium.	Coarse.	Caucho.	TOTALS.	
General Rubber Co. of Brazil, kilos	992,033	201,789	60,216	714,746	1,968,774	934,075	164,814	373,414	368,923	1,841,226	3,810,000
Tancredo Porto & Co.	551,069	175,742	45,674	192,613	965,098	841,419	202,228	304,782	167,429	1,515,848	2,480,946
Suter & Co.	292,413	16,984	8,767	371,663	689,827	572,499	50,090	187,115	193,787	1,003,491	1,693,318
Adelbert H. Alden, Limited.	617,753	15,853	9,216	425,412	1,068,234	27,029	87,968	144,937	6,653	266,587	1,334,821
Pralow & Co.	317,521	25,059	62,666	153,782	559,028	365,393	43,187	116,396	91,888	616,864	1,175,892
J. G. Araujo	284,545	21,521	43,653	37,784	387,503	418,254	65,465	147,858	73,096	704,673	1,093,176
S. A. Armazens Andresen.	10,404	461	2,783	91	13,739	420,202	36,123	101,158	177,629	735,113	748,851
Ohliger & Co.	.....	.....	.....	.....	.....	307,612	14,520	43,118	31,092	396,342	396,342
Stowell & Co.	24,501	320	.....	34,993	59,814	200,440	19,152	39,823	56	259,471	319,285
H. Balding	459	28	67	20	774	72,376	.....	.....	29,103	101,479	102,253
Gaspar Almeida & Co.	49,529	11,516	856	10,542	63,443	3,846	4,281	14,250	23,801	78,178	78,178
G. Fradelizi	.....	.....	.....	.....	.....	9,120	.....	2,609	337	12,066	25,509
M. Lobo	8,140	2,827	3,065	118	11,150	22,252	5,085	13,656	32,452	73,445	73,445
Simfonio & Co.	36,382	6,279	13,077	4,056	59,794	35,039	6,162	14,940	3,751	59,841	71,042
Amorim Irmaos	7,646	.....	40	.....	7,686	800	320	3,000	3,750	7,870	67,664
Semper & Co.	23,957	3,157	7,754	4,012	38,880	32,082	2,617	18,749	3,025	56,473	64,159
J. Carneiro da Motta	12,819	7,520	1,583	5,146	27,068	10,386	2,012	2,434	1,682	16,514	53,394
Mendes & Co.	2,400	160	720	.....	3,280	20,320	.....	400	100	20,820	47,888
B. Levy & Co.	.....	.....	.....	.....	.....	11,253	2,409	3,636	18,616	35,914	39,194
J. Marques	13,567	1,126	911	18,386	33,990	30,080	1,440	.....	6,600	38,120	38,120
Stowell & Sons	19,520	.....	.....	.....	19,520	.....	.....	685	.....	685	34,675
Coutinho & Co.	.....	.....	.....	.....	.....	1,160	7,200	4,590	1,920	14,870	34,390
Alfredo Martins Pereira	.....	.....	.....	.....	.....	10,628	1,170	7,787	10,634	30,216	30,216
Compa. Mattoque. Bohn, Limited	.....	.....	.....	.....	.....	24,783	.....	3,793	916	29,482	9,482
Mesquita & Co.	2,476	1,029	7,266	7,339	13,060	8,428	1,542	2,249	3,173	15,392	28,452
Manoel Vicent Carioca	.....	.....	.....	.....	.....	16,150	1,600	4,050	.....	21,800	21,800
Ferreira Oliveira & Co.	.....	.....	.....	.....	.....	.....	.....	17,968	17,968	17,968	17,968
Gunzburger & Co.	.....	.....	.....	.....	.....	1,246	92	2,913	12,356	16,607	16,607
Moraes Carneiro & Co.	1,760	480	.....	.....	2,240	4,212	883	6,657	1,790	13,542	15,782
Lima & Irmao	8,512	2,400	4,530	117	15,559	.....	.....	1,032	2,339	4,060	15,559
E. Strassberger & Co.	.....	.....	.....	.....	.....	435	254	1,032	2,339	4,060	4,060
Sundries (19)	24,273	4,853	16,955	25,387	71,468	32,336	4,599	8,411	5,356	50,702	122,170
In transit, Iquitos	3,289,629	499,304	289,799	2,001,207	6,079,929	4,465,872	725,213	1,574,432	1,290,222	8,055,709	14,135,638
	277,648	27,254	76,106	367,735	748,743	334,875	58,689	132,005	690,253	1,215,882	1,964,565
Totals, 1916	3,567,277	526,548	365,905	2,368,942	6,828,672	4,800,717	783,902	1,706,437	1,980,475	9,271,591	16,100,203
Totals, 1915	4,612,220	609,831	1,784,076	2,110,048	9,116,175	4,976,216	689,083	555,460	1,548,697	7,278,456	16,894,631

(Compiled by Stowell & Co., Manaoas)

EXPORTS OF INDIA RUBBER AND CAUCHO FROM PARA, DURING 1916, AND FOR NINETEEN YEARS.

NEW YORK.						EUROPE.					GRAND	
EXPORTERS.	Fine.	Medium.	Coarse.	Caucho.	TOTALS.	Fine.	Medium.	Coarse.	Caucho.	TOTALS.	TOTALS.	
I. Marques.....kilos	1,778,198	234,834	1,044,343	580,242	3,637,617	605,585	46,727	109,911	301,716	1,063,939	4,701,556	
General Rubber Co.	1,047,864	100,473	917,452	423,381	2,489,170	617,372	41,485	17,901	206,124	882,882	3,372,052	
Suter & Co.	663,379	108,549	584,084	242,276	1,598,288	216,263	13,912	7,590	251,258	489,023	2,087,311	
Stowell & Co.	367,054	22,404	116,092	1,497	507,047	225,162	16,595	2,667	97,780	342,204	849,251	
Suarez, Hermanos & Co., Limited	1,044,492	1,520	124,272	302,357	1,472,641	60,822	.....	15,186	105,335	181,343	1,653,984
Pires Teixeira & Co.	404,706	42,815	527,078	135,559	1,110,158	206,667	9,576	772	6,400	223,415	1,333,573	
Adelbert H. Alden, Limited.	98,343	72,330	142,926	42,246	355,845	567,315	.....	.....	77,207	644,522	1,000,367
G. Fradelizi & Co.	211,411	19,225	169,372	149,671	549,679	107,451	11,983	3,617	528	123,579	673,258	
Berringer & Co.	345,237	29,434	78,561	123,662	576,894	.....	.....	.....	.....	.....	576,894
Seligmann & Co.	280,577	567	35,313	194,337	510,794	1,361	.....	1,082	.....	2,443	513,237
Stowell Brothers	.....	2,210	9,240	.....	11,450	146,794	14,892	22,496	73,979	258,161	269,611
Sundries	452,780	36,571	445,835	302,167	1,237,353	206,989	25,375	54,860	230,422	517,646	1,754,999	
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From Itacoatiara	6,694,041	670,932	4,194,568	2,497,395	14,056,936	2,961,781	180,545	236,082	1,350,749	4,729,157	18,786,093	
From Manaoas	30,760	965	18,200	2,805	52,730	28,419	1,731	17,658	14,975	62,783	115,513	
From Manaoas	4,483,410	724,133	1,580,197	1,294,888	8,082,628	3,288,029	499,292	289,799	2,001,207	6,078,327	14,160,955	
From Iquitos	336,400	46,988	124,787	684,400	1,192,575	277,648	27,254	76,106	367,735	748,743	1,941,318	
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Totals, 1916	11,544,611	1,443,018	5,917,752	4,479,488	23,384,869	6,555,877	708,822	619,645	3,734,666	11,619,010	35,003,879	
To South America, Pernambuco.	193,573	1,046	7,765	202,384	202,384	
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Totals, 1916	11,738,184	1,444,064	5,925,517	4,479,488	23,587,253	6,555,877	708,822	619,645	3,734,666	11,619,010	35,206,263	
1915	10,172,277	1,383,914	6,533,882	4,429,196	22,519,269	10,654,863	1,069,832	1,084,846	2,376,890	15,186,431	37,705,700	
1914	9,972,494	1,677,762	5,645,917	4,389,925	21,686,098	9,071,232	1,114,999	1,461,862	4,385,981	16,034,074	37,720,172	
1913	7,223,363	1,354,794	5,324,881	3,198,077	17,101,115	11,749,008	1,591,241	2,456,162	6,338,207	22,114,618	39,215,733	
1912	9,477,888	2,035,278	6,503,631	3,337,691	21,354,488	12,570,242	1,414,572	2,822,694	5,200,397	22,007,905	43,362,393	
1911	7,686,680	1,571,375	5,173,230	1,669,596	16,100,881	11,230,371	1,503,869	2,504,439	4,519,039	19,757,718	35,858,591	
1910	7,500,410	1,412,311	4,489,108	1,658,661	15,060,490	11,673,302	1,506,752	3,382,432	6,416,842	22,979,328	38,039,818	
1909	9,439,722	1,767,310	5,784,170	2,655,778	19,646,980	10,832,613	1,372,221	2,950,626	5,649,763	19,757,718	39,452,203	
1908	8,280,768	1,739,505	5,616,549	1,902,620	17,539,442	10,721,266	1,419,025	2,854,624	5,528,994	20,523,909	38,063,351	
1907	8,012,592	1,863,775	5,149,312	1,580,657	16,606,336	10,783,787	1,358,264	3,190,982	5,574,783	20,907,816	37,514,152	
1906	7,406,171	1,785,315	5,496,419	1,531,399	16,192,304	9,289,310	1,253,574	3,223,944	4,799,623	18,575,451	34,767,755	
1905	7,173,463	1,518,444	4,921,222	1,647,216	15,260,345	10,522,634	1,291,703	2,958,516	4,363,690	18,656,543	33,916,888	
1904	8,062,104	1,630,355	5,394,479	1,222,580	16,309,468	7,615,817	993,955	2,503,520	3,221,376	14,334,668	30,644,136	
1903	7,248,065	1,621,827	5,029,646	1,133,857	15,033,395	9,156,872	1,167,956	2,659,748	3,776,917	16,061,567	31,094,942	
1902	6,588,524	1,614,776	4,523,413	1,133,155	13,859,868	8,522,521	1,514,521	2,595,177	2,057,222	15,689,912	28,549,780	
1901	8,027,727	1,926,505	4,271,456	1,325,290	15,550,978	7,939,010	1,556,388	2,605,553	2,638,599	14,739,520	30,290,498	
1900	6,557,277	1,199,611	3,783,279	894,500	12,434,667	7,798,537	1,401,390	3,256,969	1,857,100	14,313,996	26,748,663	
1899	7,583,405	1,319,349	4,023,710	951,815	13,878,318	6,410,647	1,030,459	2,527,013	1,583,572	11,551,691	25,430,009	
1898	5,399,654	868,982	2,759,714	801,915	9,830,265	6,794,541	1,125,688	2,995,801	1,162,712	12,078,742	21,909,000	

RUBBER STATISTICS FOR THE
DOMINION OF CANADA.IMPORTS OF CRUDE AND MANUFACTURED
RUBBER.

	November, 1916.	
	Quantity	Value
Rubber, crude:		
From—		
United States	77,341	\$41,230
Great Britain	61,883	\$46,660
Other countries	32,177	\$247,860
Totals	1,725	\$1,359
Rubber, recovered:		
From—		
United States	40,007	\$64,511
Great Britain	340	\$361
Other countries	1,188	1,058
Totals	41,435	\$65,930
Rubber thread, not covered:		
From—		
United States	1,118	\$7,457
Chicle, crude:		
From—		
United States	134,903	\$42,618
British Honduras	243,623	85,766
Mexico	91,739	30,973
Totals	469,265	\$159,357
MANUFACTURED RUBBER	General Tariff Value.	Prefer- ential Tariff. Value.
Belting:		
From—		
United States	\$3,968	
Waterproof clothing:		
From—		
United States	\$11,511	\$20,368
Other countries	148	
Totals	\$11,659	\$20,368
Hose, lined with rubber:		
From—		
United States	\$6,099	
Mats and matting:		
From—		
United States	\$454	
Packing:		
From—		
Great Britain		\$399
United States	\$6,739	
Totals	\$6,739	\$399
Tires of rubber for all vehicles:		
From—		
Great Britain	\$20	\$4,943
United States	\$6,325	
France	93	
Totals	\$6,418	\$4,943
Rubber cement and all other manufactures of india rub- ber and gutta percha, N.O.P.:		
From—		
Great Britain	\$192	\$7,470
United States	\$6,149	
Other countries	416	
Totals	\$6,757	\$7,470
Hard rubber in tubes:		
From—		
United States	\$1,080	
Webbing—over one inch wide:		
From—		
Great Britain	\$37	\$929
United States	\$9,249	
Totals	\$9,286	\$929

EXPORTS OF DOMESTIC AND FOREIGN RUBBER
GOODS.

	November, 1916.	
	Produce of Canada. Value.	Reexports of Foreign Goods. Value.
MANUFACTURED—		
Belting:		
To—		
United States	\$590	
Newfoundland	443	
Total	\$1,033	
Hose:		
To—		
Great Britain	\$2,223	
Newfoundland	1,655	
Other countries	7,235	
Total	\$11,113	
Boots and shoes:		
To—		
Great Britain	\$264,309	
United States	101	
Newfoundland	13,152	\$116
Australia	11,603	
New Zealand	3,832	
Other countries	1,318	
Totals	\$294,315	\$116
Clothing:		
To—		
United States	\$5	\$18
Tires:		
To—		
Great Britain	\$50,385	
United States	16,876	\$2,834
Other countries	4,169	52
Totals	\$71,430	\$2,886
*Rubber waste:		
To—		
Great Britain	\$2,126	
United States	16,842	
Total	\$18,968	
All other manufactures, N. O. P.:		
To—		
Great Britain	\$18,407	
United States	322	\$1,033
Newfoundland	253	
Other countries	31	
Totals	\$19,013	\$1,033
†Gum chicle:		
To—		
United States	\$259,765	

*During November 7,620 pounds of rubber waste was exported to Great Britain and 296,800 pounds to the United States.

†During November 441,231 pounds of gum chicle was exported to the United States.

LONDON AND LIVERPOOL RUBBER STATISTICS.

	IMPORTS.			
	December, 1916.			
	London.		Liverpool.	
	Pounds.	£ Sterling.	Pounds.	£ Sterling.
UNMANUFACTURED				
Crude rubber:				
From—				
German West Africa			22,300	2,094
France			35,300	1,890
French West Africa			24,500	2,365
Java	1,198,600	168,279		
Other Dutch Possessions in Indian Seas	715,900	93,565		
Belgian Congo			2,200	187
Liberia			9,600	667
United States	2,400	94	3,800	380
Mexico	3,000	300		
Gold Coast			30,100	1,143
Nigeria			67,000	4,745
Capo of Good Hope	26,600	3,990		
Zanzibar and Pemba	1,100	116		
British East Africa	100	10		
Anglo Egyptian Sudan			500	90
British India	344,300	42,877		
British Settlements	2,340,700	320,106	716,000	95,412
Federated Malay States	4,494,100	584,282	24,900	3,398
Ceylon and Dependencies	2,225,500	294,312	72,000	10,947
British North Borneo	164,600	22,219		
New South Wales	14,900	2,235		
Fiji Islands	4,800	600		
British West Indian Islands	100	12		
British Guiana	300	35		
Other			692,400	81,701
Total			2,275,700	337,013
Totals	11,570,000	1,533,032	3,876,300	542,032

Waste and reclaimed rubber:				
From—				
United States	57,000	3,496	81,700	3,945
Channel Islands	4,900	49		
Spain			300	10
New Zealand	7,200	45	97,400	1,000
British West Indies	9,000	49		
Totals	78,100	3,639	179,700	4,955
Waste and reclaimed rubber manufactures of the United Kingdom:				
To—				
United States	1,051,100	12,234	246,400	7,476
France	29,500	1,177	42,800	1,263
Italy	19,900	233		
Spain			6,700	140
Japan			7,300	115
Canada	58,400	838		
Totals	1,158,900	14,482	303,200	8,994
Crude rubber:				
REEXPORTS.				
To—				
Russia	36,900	4,760	200	32
France	1,071,700	135,258	215,000	27,601
Denmark (including Faroe Islands)	145,400	20,652		
Spain			31,800	3,922
Italy	134,400	15,123	101,000	16,507
Japan (including Formosa and leased territories in China)			71,400	11,139
United States	3,733,700	459,994	341,400	28,800
Canada	292,900	38,305	53,800	4,176
Australia			11,100	1,948
Totals	5,415,000	674,092	825,700	94,125
Waste and reclaimed rubber:				
To—				
Italy			17,800	532
Totals			17,800	532

UNITED KINGDOM RUBBER STATISTICS FOR 1916.

IMPORTS		1915.		1916.	
UNMANUFACTURED—					
Crude rubber:	From—	Pounds.	£ Sterling.	Pounds.	£ Sterling.
Dutch East Indies.....		6,411,900	716,151	12,404,100	1,716,340
French West Africa.....		1,623,400	146,920	1,366,500	144,153
Gold Coast.....		631,800	39,757	1,482,500	119,787
Other countries in Africa..		6,245,500	537,282	8,629,200	914,134
Peru.....		1,658,200	178,271	1,890,500	240,708
Brazil.....		28,639,100	3,240,779	24,018,300	3,243,115
British India.....		3,288,800	372,313	3,789,800	535,816
Straits Settlements, includ- ing Labuan.....		66,053,200	7,384,830	44,531,100	6,307,609
Federated Malay States...		28,880,300	3,340,071	44,649,700	6,181,287
Ceylon and dependencies...		28,609,700	3,230,218	22,518,000	3,156,094
Other countries.....		4,003,700	406,317	3,259,800	437,097
Totals.....		176,045,600	19,592,911	168,539,500	22,996,140
Waste and reclaimed rubber.		4,180,000	97,320	5,108,100	138,115
Gutta percha.....		8,507,744	669,193	7,480,368	690,025

MANUFACTURED		1915.		1916.	
Apparel, waterproofed.....			5,376		9,518
Boots and shoes, <i>dozen pairs</i>		160,462	264,260	250,746	438,196
Insulated wire.....			96,348		133,728
Submarine cables.....			3,089		7
Automobile tires and tubes..			1,984,563		2,207,210
Motorcycle tires and tubes...			105,123		93,173
Cycle tires and tubes.....			65,154		113,442
Tires not specified.....			20,617		10,040

EXPORTS.		1915.		1916.	
MANUFACTURED					
Apparel waterproofed:	To—	Pounds.	£ Sterling.	Pounds.	£ Sterling.
France.....			44,364		102,794
British South Africa.....			41,853		41,271
British East Indies.....			25,675		26,485
Australia.....			45,411		76,654
New Zealand.....			30,435		45,131
Canada.....			88,875		73,589
Other countries.....			247,031		331,217
Totals.....			774,489		700,141
Boots and shoes, <i>dozen pairs</i>		118,169	138,773	118,532	140,201
Insulated wire.....			362,983		546,373
Submarine cables.....			354,782		449,863
Automobile tires and tubes..			664,998		1,198,605
Motorcycle tires and tubes...			80,489		106,150
Cycle tires and tubes.....			431,049		604,333
Tires not specified.....			114,992		232,466
Manufactures not specified..			1,060,066		1,636,447

EXPORTS—FOREIGN AND COLONIAL.

UNMANUFACTURED		1915.		1916.	
To—		Pounds.	£ Sterling.	Pounds.	£ Sterling.
Russia.....		25,906,100	2,858,843	13,611,500	1,860,218
France.....		15,209,700	1,772,100	21,044,500	2,894,323
United States.....		83,180,100	9,273,915	57,454,700	8,054,300
Other countries.....		17,989,500	2,060,638	16,437,500	2,289,694
Totals.....		142,285,400	15,965,496	108,548,200	15,098,535
Waste and reclaimed rubber.		657,900	20,545	561,300	21,584
Gutta percha.....		987,953	75,576	629,328	68,499
MANUFACTURED					
Apparel, waterproofed.....			695		807
Boots and shoes, <i>dozen pairs</i>		12,077	17,583	36,883	43,606
Insulated wire.....			9,059		21,210
Automobile tires and tubes..			562,456		908,877
Motorcycle tires and tubes...			13,764		15,796
Cycle tires and tubes.....			23,180		23,916
Tires not specified.....			6,572		3,248

The average value of a £ Sterling for 1915 and 1916 was \$4.745

THE MARKET FOR RUBBER SCRAP.

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NEW YORK.

UNDOUBTEDLY the difficulties surrounding domestic transportation are responsible for the quiet conditions that have characterized the February market. With embargoes placed on all shipments to and from New York and serious car shortage all over the country there was small chance for good business during the past month. Despite the handicap, however, there has been a quiet routine demand and prices are about the same as they were a month ago. Few changes may be noticed.

BOOTS AND SHOES. The trading in this material has been quiet and prices remain unchanged.

AUTO TIRES. Standard white G. & G. tires have received scant attention and prices have eased off considerably. Standard white tires have moved fairly well and show an advance of ½ to ⅝ cent since our last report. The other grades are unchanged.

AUTO PEELINGS. Both No. 1 and No. 2 grades shows an advance of about ½ cent.

INNER TUBES. The tube position has been materially strength-

ened by the firm position of crude rubber and all grades are quoted from ½ cent to 1 cent higher than a month ago.

BICYCLE TIRES. The movement in this material has been moderate and prices have moved up ⅛ to ¼ cent.

NEW YORK QUOTATIONS FOR CARLOAD LOTS DELIVERED.

FEBRUARY 24, 1917.

Prices subject to change without notice.

	Per Pound.
Boots and shoes.....	\$0.09½ @ .09¾
Trimmed arctics.....	.07¾ @ .07¾
Untrimmed arctics.....	.06½ @ .06½
White tires, Goodrich and Goodyear.....	.07¾ @ .08
Auto tires, standard white.....	.07¼ @ .07¼
standard mixed.....	.06¾ @ .06¾
stripped, unguaranteed.....	.04¾ @ .05
Auto peelings, No. 1.....	.10 @ .10
No. 2.....	.08¾ @ .09
Inner tubes, No. 1.....	.26 @ .27
No. 2.....	.12 @ .13
red.....	.12 @ .13
Irony tires.....	.02½ @ .02½
Bicycle tires.....	.04¾ @ .05¼
Solid tires.....	.05¾ @ .06
White scrap, No. 1.....	.13½ @ .14
No. 2.....	.10 @ .10
Red scrap, No. 1.....	.10 @ .11
No. 2.....	.08 @ .08
Mixed black scrap, No. 1.....	.04¾ @ .04¾
No. 2.....	.04 @ .04
Rubber car springs.....	.04½ @ .04½
Horse shoe pads.....	.04¾ @ .04¾
Mattings and packings.....	.01 @ .01½
Garden hose.....	.01¾ @ .01¾
Air brake hose.....	.05½ @ .05¾
Cotton fire hose.....	.02½ @ .02½
Large hose.....	.01¾ @ .01¾
Hard rubber scrap, No. 1, bright fracture.....	.26 @ .26
Battery jars (black compound).....	.02½ @ .02½
Insulated wire stripping.....	.03½ @ .03½
Rubber heels.....	.03¾ @ .03¾

THE MARKET FOR COTTON AND OTHER FABRICS.

Copyright 1917.

NEW YORK.

THE announcement of the German submarine blockade was instantly reflected in the market and prices declined. On February 1, spot cotton was quoted 14.75 cents as compared with 17.40 cents on January 29. As time passed with no overt act on the part of Germany the market gained strength and on February 27 middling spot cotton was quoted at 16.55.

EGYPTIAN COTTON. The scarcity of spot stocks and the small receipts during the past month has strengthened the market. Imports for the period December 27, 1916-January 17, 1917 were 9,000 bales as against 12,700 bales a year ago. Prices are firm, Sakellarides being quoted 50 to 55 cents on February 25. The price nominally is 30 cents.

Concerning the 1917 crop, The Alexandria Cotton Co., Limited, reports the following mail advices from Alexandria, dated January 19: "Thanks to the splendid weather we have had during the past week, the first ploughing for planting has been vigorously resumed over the whole country. However, it is too early to express any definite opinion as to the proportion of the varieties which will compose the next crop, but there is a general tendency to sow Sakellarides again over the whole of the Delta with the exception of the north, where the Assil and Nubari varieties seem to be more in favor owing to last year's failure of the Sakellarides variety in the poor lands of that district.

SEA ISLAND COTTON. The threatened abandonment of the Sea Island cotton industry due to the boll-weevil pest has been in a measure dispelled. Undoubtedly there will be a curtailment in the 1917 crop; that may result in a two-thirds crop reduction. In this event prices would doubtless reach abnormal levels. The normal crop is 100,000 bales.

The demand has been active and prices firm during the month. New York spot quotations have varied from 49 to 55 cents; depending on the quantity.

TIRE FABRICS. The demand has actively continued and contract deliveries have been insistently called for. This may be due to shipping delays, the result of car shortage and local embargoes; however, the uncertain position of the raw material would be sufficient reason for anticipatory buying. The level of prices may

be said to be higher than a month ago. Experiments in the substitution of combed Peelers for Sea Island and Egyptian tire fabrics are being made as a relief measure should the long staple supply be curtailed.

MECHANICAL DUCK. The government has come into the market for supplies in large quantities, thereby strengthening the position of all mechanical duck. As a result prices on hose and belting duck are firmer and contracts are being written further ahead.

SHEETINGS, DRILLS AND OSNABURGS. The demand has been good as many buyers have anticipated their requirements. The market has been visibly strengthened by the prospective government business. However, prices have remained unchanged.

RAINCOAT CLOTH. The imported fabrics have apparently not been affected by the blockade as contract deliveries are being promptly made. The domestic mills are reported to be slow in making deliveries in view of the uncertain market conditions that appear to indicate higher prices.

NEW YORK QUOTATIONS.

FEBRUARY 24, 1917.

Prices subject to change without notice.

Airplane and Balloon Fabrics:			
Wamsutta, S. A. I. L. No. 1, 40-inch.....	yard	\$0.35	@
No. 4, 38½-inch.....		.35	@
Wool Stockinettes—52-inch:			
A—14-ounce.....	yard	1.38	@
B—14-ounce.....		1.65	@
C—14-ounce.....		1.92	@
Cotton Stockinettes—52-inch:			
D—14-ounce.....	yard	.55	@ .60
E—11½-ounce.....		.46	@ .55
F—14-ounce.....		.60	@ .65
G—8-ounce.....		.52	@ .55
H—11-ounce.....		.55	@ .60
I—9-ounce.....		.46	@ .50
Colors—white, black, blue, brown.			
Knitabac Stockinette.....	lb.	1.00	@ 1.05
Tire Fabrics:			
17½-ounce Sea Island, combed.....	square yard	1.25	@ 1.35
17½-ounce Egyptian, combed.....		1.10	@ 1.15
17½-ounce Egyptian, carded.....		1.07	@ 1.12
17½-ounce Peelers, carded.....		.70	@
Sheeting:			
40-inch 2.35-yard.....	yard	.15¾	@
40-inch 2.50-yard.....		.14¾	@
40-inch 2.70-yard.....		.14	@
40-inch 2.85-yard.....		.13	@
40-inch 3.15-yard.....		.12¾	@
Osnaburgs:			
40-inch 2.25-yard.....	yard	.16¾	@
40-inch 2.48-yard.....		.15	@
37½-in. 2.42-yard.....		.15¾	@
Mechanical Ducks:			
Hose.....	pound	.37	@ .38
Belting.....		.36	@ .37
Carriage Cloth Duck:			
38-inch 2.00-yard enameling duck.....	yard	.20	@
38-inch 1.74-yard.....		.22½	@
72-inch 16.66-ounce.....		.44½	@
72-inch 17.21-ounce.....		.46	@
Drills:			
38-inch 2.00-yard.....	yard	.19	@
40-inch 2.47-yard.....		.15¾	@
52-inch 1.90-yard.....		.20½	@
52-inch 1.95-yard.....		.20	@
60-inch 1.52-yard.....		.26¼	@
Imported Woolen Fabrics Specially Prepared for Rub-			
berizing—Plain and Fancies:			
63-in. 3¼ to 7½ ounces.....	yard	.38	@ 1.55
36-inch, 2½ to 5 ounces.....		.35	@ .85
Imported Plaid Lining (Union and Cotton):			
63-inch, 2 to 4 ounces.....	yard	.35	@ .75
36-inch, 2 to 4 ounces.....		.25	@ .50
Domestic Worsted Fabrics:			
36-inch, 4¼ to 8 ounces.....	yard	.35	@ .65
Domestic Woven Plain Linings (Cotton):			
36-inch, 3¼ to 5 ounces.....	yard	.10	@ .18
Raincoat Cloth (Cotton):			
Bombazine.....	yard	.08	@ .09½
Twills.....		.12	@ .18
Tweed.....		.25	@ .35
Tweed, printed.....		.07½	@ .15
Plaid.....		.08½	@ .10
Repp.....		.24	@ .27
Burlaps:			
32—7½-ounce.....	100 yards	6.90	@
40—7½-ounce.....		8.25	@
40—8-ounce.....		8.35	@
40—10-ounce.....		9.25	@
40—10½-ounce.....		9.50	@
45—7½-ounce.....		9.40	@
45—8-ounce.....		9.50	@
48—10-ounce.....		11.50	@

SEA ISLAND CROP MOVEMENT.

FROM AUGUST 1, 1916, TO FEBRUARY 2, 1917.

	Receipts	Receipts
	1916-17	1915-16
Stock on hand, August 1, 1916—		
Savannah, 2,401; Charleston, 197.....	bales	2,508
Received at Savannah (Gross).....		38,489
Received at Charleston.....		3,153
Received at Jacksonville.....		29,367
Totals.....		73,517
Less Exports.....		*64,927
Stock, February 2, 1917		
Savannah, 6,864; Charleston, 1,726.....		8,590
Crop in sight at all ports to date.....		*70,775
		15,598
		65,554

EXPORTS

From—	Great Britain.	Continent.	Northern Mills.	Southern Mills.	Totals.
Savannah.....	989	120	28,457	4,460	34,026
Charleston.....	261		1,273		1,534
Jacksonville.....			29,367		29,367
Totals.....	1,250	120	59,097	4,460	*64,927
1915-16.....	555	1,060	46,699	4,024	52,338
Inc. 695	Dec. 940	Inc. 12,398	Inc. 436	Inc. 12,589	

*In addition to the exports shown above there has been a heavy movement direct from interior points to Southern mills and to Northern mills via Norfolk. It is impossible to say at present just how much cotton has been moved in this manner, but it is known to be somewhere between 15,000 and 20,000 bales. The latter figure is probably nearer the correct amount.

(Compiled by John Malloch & Co., Savannah, Georgia.)

EGYPTIAN COTTON CROP MOVEMENT.

FROM AUGUST 1, 1916, TO JANUARY 17, 1917.

To—	1916-17.	1915-16.	1914-15.
Liverpool.....	bales	132,074	136,760
Manchester.....		87,702	65,948
Total shipments to Great Britain.....		219,776	202,708
			160,382
To—			
France.....	12,102 }	19,399	25,770
Spain.....	7,297 }		18,106
Italy.....	17,951 }	26,345	21,706
Switzerland.....	8,394 }		70,434
Russia.....	19,167	23,309	18,205
Greece.....	65	50	1,433
Total shipments to Continent.....		64,976	70,835
			108,178
To			
United States.....		69,770	107,656
India.....	100 }		67,480
Japan.....	6,375 }	6,475	12,585
			5,863
Total shipments to all parts.....		360,997	393,784
			341,903
Total crop (interior gross weight) cantars.....		4,726,518	6,473,726

(Compiled by Davies, Benachi & Co., Liverpool.)

THE MARKET FOR CHEMICALS AND COMPOUND-INGREDIENTS.

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NEW YORK.

THE base metals that are used in the manufacture of rubber chemicals and compounding ingredients have occupied a strong market position during the past month, due wholly to transportation difficulties. On February 20 the copper metal had advanced 2 cents since February 1. Lead shows a gain of 1 cent, spelter has advanced .875 cents and the metal antimony has gained 5 cents during the same period. Aluminum has been dull and unchanged at 57 to 59 cents.

There has been a good general demand for all compounding materials during the past month and prices in some instances have advanced. The recent diplomatic crisis only resulted in tightening the ocean shipping situation. The freight embargoes that have been placed on all domestic shipments and the car shortage have more seriously affected the rubber chemical trade than has the political situation. Supplies from the west and middle west have been held up and contract deliveries from the eastern points greatly impeded. In view of the present adverse situation and the uncertain future it is advisable to anticipate forward requirements.

ANTIMONY SULPHURETS. The metal situation has stiffened

the market on this material, which has been in good demand.

ANILINE OIL. Prices have advanced about 5 cents since our report a month ago.

CARBON BLACK. The demand appears to be fully up to the supply. Prices are firm at figures ruling a month ago.

CHINA CLAY. The domestic material continues at high levels, being quoted at \$16 to \$25 the ton in carload lots. The nominal price is \$8 to \$10.

NAPHTHA. Solvent naphtha has advanced about 1 cent a gallon since our last report.

TALC. All imported grades are strong, due to foreign shipping difficulties. The domestic demand is good at unchanged prices.

VERMILION. English vermilion has advanced sharply owing to the embargo on English mercury. California supplies are handicapped by the car shortage and high freight rates.

WHITING. There seems to be no relief from foreign supplies of the raw material and the situation grows more acute. Domestic grinding is making good progress and deliveries from a southern mill were made during the month. The consuming trade is paying \$1.10 to \$1.15 a hundredweight for gilder's whiting.

ZINC OXIDE. The New York market has been quite firm, the XX brand going at 13 to 14 cents in second hands. Prices were easier in the middle west, due to local supplies. However, later in the month heavy demands were made on New York stocks, resulting in firmer prices on the American grades in second hands.

NEW YORK QUOTATIONS.

FEBRUARY 26, 1917.

Subject to change without notice.

Accelerene	lb	\$2.62	@
Acetone (drums)	lb	.3	"
Acid, acetic, 28 per cent. (bbls.)	lb	.032	@ .04
cresylic (crude)	gal	.75	@ .80
glacial, 99 per cent (carboys)	lb	.25	@ .26
muriatic, 20 degrees	lb	.0134	@ .02
nitric, 36 degrees	lb	.0434	@
sulphuric, 66 degrees	lb	.014	"
Alumina, To-six-o (carloads)	ton	19.00	@
Aluminum Flake (carloads)	ton	22.00	@
Ammonium carbonate	lb	.10	@ .10 1/2
Antimony, crimson, sulphuret of (casks)	lb	.50	@ .60
crimson, "Magnetco"	lb	Nominal	
crimson, "Mephisto" (casks)	lb	.48	@
golden, sulphuret of (casks)	lb	.15	@ .30
golden, "Magnetco"	lb	Nominal	
golden, "Mephisto"	lb	.28	@
golden, sulphuret, States brand, 16-17 per cent.	lb	.25	@
red sulphuret, States brand	lb	.25	@
Asbestine	ton	18.00	@ 17.00
Asbestos	ton	20.00	@ 40.00
Asphaltum "G" Brilliant	lb	.03 1/2	@
Barium sulphate, precipitated	lb	.05	@
Barytes, pure white	ton	30.50	@ 32.00
off color	ton	18.00	@ 20.00
Basofor	ton	108.00	@
Benzol, pure	gal	.55	@ .60
Beta-Naphthol (f. o. b. New York)	lb	.92	@ .95
Brown, sienna, raw powdered	lb	.04	@ .06
umber, raw powdered	lb	.03	@ .03 1/2
Bone ash	lb	Nominal	
black	lb	.04	@ .08
Cadmium tri-sulphate (f. o. b. London)	lb	Nominal	
sulphide, yellow	lb	2.25	@
Cantella gum	lb	.33	@
Carbon, bisulphide (drums)	lb	.05	@
black (cases)	lb	.27	"
tetrachloride (drums)	lb	.18	@
Caustic soda, 76 per cent.	lb	.04 1/2	@
Chalk, precipitated, extra light	lb	.04 1/2	@ .05 1/2
precipitated, heavy	lb	.03 1/2	@ .05
China clay, domestic (powdered)	ton	25.00	@
imported (powdered)	ton	65.00	@
Chrome, green	lb	.40	@
yellow	lb	.4	@
Cotton linters	lb	Nominal	
Excellerex	lb	.85	@ .90
Fossil flour	lb	.04	@ .10
Gas black	lb	.14	@ .20
Gilsonite	ton	40.00	@
Glue, high grade	lb	.50	@ .60
medium	lb	.22	@ .23
low grade	lb	.17	@ .27
Glycerine, C. P. (drums)	lb	.54 1/2	@ .55
Graphite, flake (400 pound bbl.)	lb	.25	@
powdered (400 pound bbl.)	lb	.08	@
Green oxide of chromium (casks)	lb	.75	@ .85
Ground glass (fine)	lb	.02 1/2	@
Hexamethylenamine	lb	.60	@ .65
Indian red, reduced grades	lb	.06	@ .07
pure	lb	.08	@ .09
Infusorial earth, powdered	ton	60.00	@
bolted	ton	70.00	@

Iron oxide, red, reduced grades	lb	.02 1/2	@ .03 1/2
red, pure, bright	lb	.11	@ .13
Ivory, black	lb	.18	@ .30
Lampblack	lb	.12	@ .13
Lead, red oxide of	lb	.10 1/2	@
sublimed blue	lb	.08 1/2	@
sublimed white	lb	.08 1/2	@
white, basic carbonate	lb	.08 1/2	@ .09 1/2
white, basic sulphate	lb	.08 1/2	@
black hyposulphite (Black Hypo)	lb	.45	@ .75
Lime, flour	lb	.01 1/2	@ .01 1/2
Litharge	lb	.09 1/2	@
English	lb	.12	@
sublimed	lb	.09 1/2	@
Litropone, imported	lb	Nominal	
domestic	lb	.06	@ .06 1/2
Beckton white (carloads)	lb	Nominal	
Magnesia, carbonate	lb	.12	@ .15
calcined, heavy	lb	.09	@ .11
heavy, Thistle Brand	lb	.12	@
light	lb	.50	@
Magnesite, calcined, powdered	ton	35.00	@ 39.00
Mica, powdered	lb	.03 1/2	@ .05
Mineral rubber	lb	.01	@ .02
"M. R. X."	ton	100.00	@
"Genasco" (carloads)	ton	37.00	@
"Richmond Brand"	lb	.03	@
"No. 64 Brand"	ton	40.00	@
"Refined Elaterite"	lb	.05	@
"Rubrax"	ton	32.50	@
Naphtha, stove gasolene (steel bbls.)	gal	.23	@
66@68 degrees (steel bbls.)	gal	.27	@
68@70 degrees (steel bbls.)	gal	.28	@
V. M. & P. (steel bbls.)	gal	.21	@
Oil, aniline	lb	.26	@ .28
corn, refined (Argo)	cuwt	12.76	@
linseed (bbl.)	gal	.93	@
palm	gal	.12	@ .12 1/2
paraffin	gal	.17	@
pine (cases)	gal	.65	@
rapeseed, blown	gal	1.15	@ 1.17
rosin, heavy body	gal	6.75	@
tar (cases)	gal	.22	@
soluble aniline colors, yellow, orange, red, violet, blue, green	lb	5.00	@ 15.00
Orange mineral, domestic	lb	.12 1/2	@
Paragol (carloads)	cuwt	10.54	@
Petrolatum	lb	.06 1/2	@
Petroleum grease	lb	.04	@
Pine solvent	lb	Nominal	
Pine tar	bbl	8.50	@
Pitch, burgundy	lb	.03 1/2	@ .04
coal tar	bbl	4.50	@
pine tar	bbl	9.35	@
Plaster of paris	lb	1.50	@ 1.70
Prussian blue	lb	.80	@
Pumice stone, powdered (bbls)	lb	.03	@ .04
Resin, Pontianak, refined	lb	Nominal	
granulated	lb	Nominal	
fused	lb	Nominal	
Rosin (500 pound bbls.) @ 280 lbs.	bbl	6.50	@ 8.50
Rotten stone, powdered	lb	.02 1/2	@ .04
Rubber black	lb	Nominal	
Rubber substitute, black	lb	.09	@ .12 1/2
white	lb	.13 1/2	@ .18
brown	lb	.12 1/2	@ .18
Rubhide	lb	.35	@ .40
Shellac, fine orange	lb	.48	@ .55
Silex (silica)	ton	25.00	@ 35.00
Soapstone, powdered	ton	14.00	@ 20.00
Starch, corn, powdered	lb	.04	@ .04 1/2
Sulphur chloride (drums)	lb	.09 1/2	@
Sulphur, flour, velvet, brand (carloads)	cuwt	2.20	@
Bergenport, pure soft brand	cuwt	2.20	@
Talc, American	ton	14.00	@ 18.00
French	ton	24.00	@ 28.00
Toluol, pure	gal	1.75	@ 2.00
Tripolite earth, powdered	ton	60.00	@
bolted	ton	65.00	@
Turpentine, pure gum spirits	gal	.52	@
wood	gal	.50	@
Venice	gal	.11	@ .12
Ultramarine blue	lb	.20	@ .40
Vermilion, brilliant	lb	.20	@ .25
Chinese	lb	.95	@ 1.00
English	lb	1.50	@ 1.60
Wax, beeswax, white	lb	.55	@ .60
ceresin, white	lb	.18	@ .22
carnauba	lb	.35	@ .55
ozokerite, black	lb	.55	@ .60
green	lb	.70	@ .75
montan	lb	.30	@
paraffin, refined 118/120 m. p. (cases)	lb	.07	@ .07 1/2
123/125 m. p. (cases)	lb	.07 1/2	@ .08
128/130 m. p. (cases)	lb	.08 1/2	@ .09
133/136 m. p. (cases)	lb	.09 1/2	@ .10
crude, white, 117/119 m. p. (bbls.)	lb	.06 1/2	@ .06 1/2
yellow, 124/126 m. p. (bbls.)	lb	.06 1/2	@ .07
Whiting, Alba	cuwt	1.00	@ 1.25
commercial	cuwt	1.60	@
gilders	cuwt	1.10	@
Paris, white, American	cuwt	1.25	@
English cliffstone	cuwt	1.50	@
Wood pulp XXX (carloads)	ton	Nominal	
Yellow ochre (Satin)	lb	.02 3/4	@
India rubber	lb	Nominal	
Zinc oxide, American process, horsehead brand	lb	Nominal	
"Special"	f. o. b. factory lb	.10	@
"XX red"	f. o. b. factory lb	.10	@
French process, green seal	f. o. b. factory lb	.10	@
red seal	f. o. b. factory lb	.10	@
white seal	f. o. b. factory lb	.18 1/2	@
Zinc substitutes	ton	25.00	@
Zinc sulphide, pure	lb	.07	@



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Edited by HENRY C. PEARSON—Offices, No. 25 West 45th Street, NEW YORK.

Vol. LVI. No. 1.

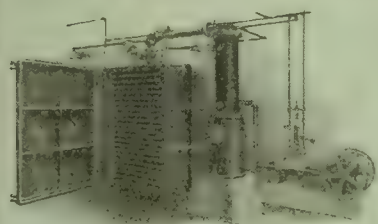
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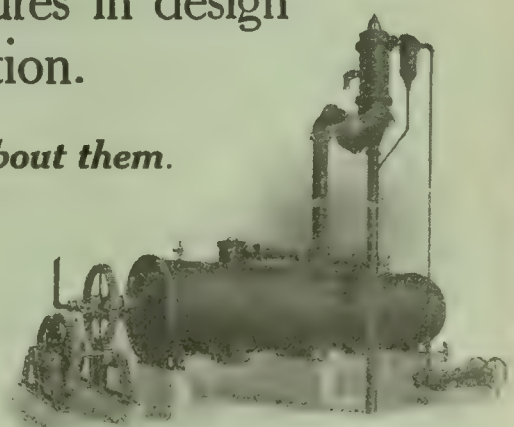


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Published on the 1st of each month by

THE INDIA RUBBER PUBLISHING CO.

No. 25 West 45th Street, New York.

Telephone—Bryant 2576.

CABLE ADDRESS: IRWORLD, NEW YORK.

HENRY C. PEARSON, Editor

Vol. 56

APRIL 1, 1917

No. 1

SUBSCRIPTIONS: \$3.00 per year, \$1.75 for six months, postpaid, for the United States and dependencies and Mexico. To the Dominion of Canada and all other countries, \$3.50 (or equivalent funds) per year, postpaid.

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Entered at the New York postoffice as mail matter of the second class.

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ALTHOUGH crude rubber prices in the United States have risen somewhat, the submarine menace has as yet affected the supply scarcely at all. Nevertheless, the importance of a larger merchant marine grows daily in the minds of rubber, cotton and other importers and exporters of raw materials and manufactured goods. American commerce of every sort is carried on to a great extent in foreign bottoms, principally British, and as more and more ships have been requisitioned for war transport, and the toll of sinkings has increased, both importers and exporters have oftener experienced annoying delays and higher cargo rates because of the lack of adequate tonnage. Henceforth we shall have the full benefit of our armed merchantmen, but if, as now seems likely, the United States is destined to suffer greater losses through ruthless submarine activities the need of ships is likely to become more pronounced.

London and Berlin figures are widely at variance, but submarine warfare, measured by either, has thus far

fallen considerably short of its aim. Yet the campaign can hardly be said to be altogether a failure, although the list of submarines captured and destroyed is also believed to be a large and growing one. British embargoes and greatly restricted imports will minimize the effect of ship losses and conserve cargo space to the utmost, but, of course, British exigency will have first consideration in determining to what British cargo space shall be devoted.

The question whether America can have a merchant marine of its own worthy of the name is already answered. Bureau of Navigation statistics show that we can and do have one of more than 4,000,000 gross tons, exclusive of lake and river trade, that ranks second in the world's list, although only one-fourth England's tonnage at the outbreak of the war. Better still, last year was the third best in our shipbuilding annals. There were constructed in American shipyards 1,163 vessels of 520,847 gross tons to sail under the American flag, 886 vessels of 405,744 gross tons being for foreign trade. The figures for 1917 promise to be much more encouraging, for on February 1, American private yards were building, or under contract to build, 415 steel ships of 1,529,854 gross tons and 161 wooden vessels of 207,623 gross tons, most of them for ocean trade. Inadequate as is our new merchant marine, it provides the foundation upon which standardized construction and bulk production, as in the automobile industry, will build a great overseas carrier system of the future if properly safeguarded.

As a result of the war, high freight rates and scarcity of tonnage have rendered shipping under American registry very profitable, but this will not long continue with the coming of peace. The certain prompt replacement of British and European tonnage will in a few years reverse the situation unless preventive measures to promote our own reawakened shipping industry are taken in time. It is a national duty to protect the capital so courageously invested under only temporarily favorable circumstances in this potential American asset. Our shipping laws must be such that we can meet our own cargo requirements and compete successfully with other nations for a rightful share of the world's commerce.

RAILWAY SERVICE MUST BE MAINTAINED.

THE epochal decision of the United States Supreme Court upholding the constitutionality and enforceability of the Adamson law, establishing an 8-hour day in computing railway wage schedules, appears permanently to have eliminated the probability of future transportation paralysis such as twice threatened to imperil the nation during a gravely momentous period in its history and to bring American industry virtually to a standstill. The majority opinion is of far-reaching importance in declaring that both carriers and employees engaged in interstate commerce charged with public interest are sub-

ject to compulsory arbitration by Congress of differences affecting operation.

The agreement reached between the railway managers and the four brotherhoods to avert a nation-wide strike should by no means be overlooked, however. As a result of their public-spirited concession, previous to the court decision, the railway managers emerge with great credit from the controversy. It now remains for organized labor to make good its own recent pledge of patriotism, supporting the President in any measures he may deem it necessary to take as the international situation develops. Of course, in increasing operating expenses approximately \$50,000,000 a year in trainmen's wages, the railway managers have paved the way for a ruling by the Interstate Commerce Commission granting higher freight rates. The public will later hear of this through local storekeepers of every sort, but the public has an extraordinary liking for indirect taxation such as this in contrast with higher passenger rates which all can see.

THE EGYPTIAN COTTON EMBARGO.

THE embargo on shipments of Egyptian cotton from Alexandria and Liverpool, recently declared by the British Government, has the appearance of an unnecessary precaution. While the Indian cotton tariff is likely to be of direct benefit to Great Britain in the conduct of the war, this embargo is not of equally certain intent. Possibly she desires to place the importation of cotton by the United States under control similar to that of rubber, yet it is doubtful that much, if any, Egyptian cotton reaches British enemies through American re-exports. Shipments to the United States have shown a steady increase, it is true, but the manufacture of automobile tires has made a corresponding growth. A conservative estimate places the 1917 output at 25,000,000, and it is for tire fabrics that most of the imported Egyptian cotton is used.

A significant sidelight on the present situation is seen in the keen interest now being manifested by tire manufacturers in long-staple cotton planting, to the details of which an article on another page is devoted.

PENALIZING CARELESSNESS.

ACCIDENT compensation laws are highly commendable, and it is an indication of progress that 33 states have enacted such legislation with numerous amendments. Unfortunately, however, these acts are so widely at variance, both in safeguards required and damages prescribed, as to render it a considerable task for firms engaged in interstate business to keep tabs on all of them and avoid violating the laws of one state while abiding by those of another. Real need of uniformity exists, and with the coming of standardization several reforms should be inaugurated. A national bureau on uniform safety devices for each industry is needed, and

deformed persons should be insured a fair chance to secure employment.

The most important reform, however, lies in the direction of penalizing carelessness. Statistics show that year after year accidents due to carelessness of the injured greatly exceed those due to lack of safeguards, yet not one of the states having accident compensation laws takes this cause into consideration. Many accidents attributed to carelessness are in reality the result of employes misrepresenting their ability when being hired, and therefore being assigned to work for which they are unqualified. Obviously, the employe as well as the employer should shoulder his just portion of the liability. Uniform laws in justice to all will be admittedly difficult to frame, but the matter deserves earnest, impartial study and early action.

F. M. S. RUBBER EXPORT TAX.

THE disposition of American rubber manufacturers to extend their Far East plantations has led to protective measures on the part of British rubber interests. The initial step was taken by the Federated Malay States when a so-called "War Taxation Enactment," effective for one year from January 1, 1917, was passed, imposing export taxes on rubber and tin in addition to the regular customs duties. When the price of cultivated rubber does not exceed 2s. 6d. per pound, the tax is 2½ per cent ad valorem, otherwise 5 per cent. British property owners liable to pay an income tax on the profits from exported rubber are exempt from this export tax. Similar preferential enactments are likely to result elsewhere under British suzerainty. While obviously detrimental to American interests this is deemed an act of justice to the pioneers who risked their capital in building up the plantation industry of Malaya.

THE MOTORIZATION OF THE CIRCUS.

THE noble horse has made his last stand as a transportation necessity, and lost. For many years the motor vehicle has been usurping his place for pleasure driving, heavy hauling, light deliveries and fire service. In the world war, too, much of his former work is being done by motors. And last month came the announcement that even the circus manager is forsaking him, except for show purposes. The world's first motor truck circus, to be launched in May by the United States Circus Corporation, promises to revolutionize the outdoor amusement business, if not several lines of purely commercial transportation. The experiment will be watched in several quarters with the utmost interest because the severity of the test may bring about a distinct change in the type of solid tires for heavy trucks. At the outset both trucks and trailers will be equipped with large, single-tread solid tires designed to supply what the dual tread lacks in traction, even wear and extraordinary strength necessary to resist the strains of heavy service.

The Nature and Uses of Rubber Solvents—II.

By Lothar E. Weber, Ph. D.

[In the first instalment of this article Dr. Weber discussed gasoline, including casing-head and cracked gasoline, its characteristics, more desirable methods of designation, uses in dipped goods and cements, and solvent recovery.]

BENZOL.

NEXT to gasoline the most important solvent which finds commercial utilization in the rubber industry is benzol.

While there is a definite chemical compound of this name, the term benzol is used in a generic sense to denote certain liquid hydrocarbons which are found in coal-tar.

When bituminous coal is subjected to destructive distillation,* there is obtained (1) illuminating gas, (2) an aqueous liquid, the most important constituent of which is ammonia, (3) coal-tar, and (4) a residue of coke. The coal-tar is a viscous liquid of characteristic odor. It is intense black in color, due to the presence of suspended particles of carbon. This is the same coal-tar which, as the basis of many dyestuffs and medicinal preparations, has been so widely discussed during recent years. It is a highly complex mixture, containing as it does, substances of widely different characteristics and properties. Amongst them is benzol, which is present to the extent of only about 1.5 per cent.

By subjecting the coal-tar to distillation, the benzol is separated from the remaining substances. As has already been stated, the term benzol is used to designate a group of generic hydrocarbons, which latter bear very much the same relationship to each other that the paraffin hydrocarbons do. Fortunately the gravity nomenclature is not used in designating these hydrocarbons, they being referred to technically on a boiling point basis. By "Benzol Pure" one infers a solvent consisting essentially of the chemical substance known as benzol. This material has a constant boiling point of 80.4 degrees C. (177 degrees F.) Under "100 per cent Benzol" one designates the material which is 100 per cent distillable at 100 degrees C. The material which is 90 per cent distillable at 100 degrees C. is referred to as "90 per cent Benzol." This nomenclature is a logical and desirable one, in that it enables a purchaser at a glance to know the comparative boiling points, and hence the volatility of the solvent.

In the United States it is the 90 per cent benzol which probably finds the largest application in rubber manufacture. This product consists of about 70 per cent pure benzol, the residue being for the most part toluol. The 90 per cent benzol is seldom used for spreading purposes, but it finds considerable application in the manufacture of cements and dipped goods, and to a certain extent in the cold cure.

Benzol—meaning thereby 90 per cent benzol—is much to be desired over gasoline as a rubber solvent. It is in the first place a more uniform product, has a much narrower range of boiling points, and largely increased solvent power. Whereas a gasoline solution is always opaque in appearance, a benzol solution of rubber is clear and transparent. There is no indication of any suspended matter being in the rubber solution, which is always the case when gasoline is used as a solvent. Probably on account of this homogeneity the film resulting from a benzol solution of rubber is stronger in its physical properties, and at the same time more transparent in appearance, than is the film produced from a gasoline solution. The range of boiling points being narrower, there is less chance for the formation of blisters in the case of dipped goods and blowing in the case of cement when benzol is the solvent employed. Under present conditions the price of benzol is more than double that of gasoline, but after cessation of hostilities the discrepancy in their prices will

probably be slight, owing to the vastly increased benzol production in this country. When such is the case, it will be very much to the advantage of the rubber manufacturer to substitute the utilization of benzol for gasoline in dipped goods and cements.

SOLVENT NAPHTHA

This material is also obtained from coal-tar and has no relation whatsoever to any petroleum product. Its boiling points range from about 140 degrees C. to 170 degrees C. It consists essentially of two hydrocarbons known as xylene and cumene.

Solvent naphtha has never found wide application on the part of the rubber manufacturer in the United States, though it is used very extensively in Europe. Gasoline is used to a moderate degree by the European rubber manufacturer, and scarcely ever in the spreading operation, except in limited admixture with solvent naphtha. The claim is authoritatively made that gasoline itself cannot be used with any degree of safety in England for the spreading operation, the peculiar atmospheric conditions which obtain creating an excessively precarious fire risk. It is, indeed, a fact that in the days prior to the development of the internal combustion engine when gasoline was a drug on the market, European manufacturers used solvent naphtha almost exclusively as the spreading solvent, and this in spite of the fact that the latter, as produced abroad at that time, had serious objections in that it imparted an odor to the spread compound. The odor is due to the very disagreeably smelling substance known as pyridine, which even when present in the solvent to the extent of less than 0.1 per cent, makes itself exceedingly offensive. The solvent naphtha produced in America is almost invariably free from even these minute traces of pyridine, as also is the European product as usually marketed within recent years.

SHALE OIL.

In Scotland, and to a certain extent in Germany, the destructive distillation of certain bituminous shales is carried on quite extensively. Shale is a rock formation, usually of a brownish or gray color, which is permeated with bitumen. The shale is heated in retorts, whereby the bitumen suffers destructive distillation. From the tar resulting on distillation there is obtained shale naphtha, which has physical properties analogous to the solvent naphtha obtained from coal-tar. While shale naphtha has found very little application in America, it is used quite extensively in Europe for purposes where the odor does not militate against its use.

CARBON BISULPHIDE.

This solvent is made by the interaction of carbon and sulphur. The older method of passing sulphur vapor over coke or charcoal, heated to a red heat, has been practically superseded by the electrical method, whereby the two components are heated in an electric furnace. Carbon bisulphide, when strictly pure, has a sweetish, pungent odor, although the article of commerce is more or less evil smelling, owing to the presence of certain sulphur impurities. Carbon bisulphide boils at 46 degrees C., and even at ordinary temperatures is extremely volatile. Great care has to be exercised in the handling of it, for the reason that its vapors are inflammable when heated only to the relatively low temperature of 150 degrees C. When carbon bisulphide burns, there is produced sulphur dioxide and carbon dioxide, both extremely suffocating and irritating gases.

*By destructive distillation is meant the heating of a substance, in the absence of air, to a temperature at which decomposition results.

Carbon bisulphide finds practically only one application in the rubber industry and that is as a diluent for sulphur chloride in vulcanization. Owing to the disagreeable properties of carbon bisulphide just enumerated, many attempts have been made to find a substitute for it. While combinations of solvents have been obtained which give passable results, it is, indeed, a fact that nothing has been found which can replace carbon bisulphide with complete satisfaction.

The sulphur chloride cure is essentially a surface vulcanization, both in the case of the vapor cure and the wet cure. It is the surface of the rubber article which is primarily subjected to the action of the sulphur chloride. To be sure, the rubber below the surface is also acted upon, but, broadly speaking, except in the thinnest of articles, the sulphur chloride cure is not a thoroughly uniform one in the direction of the thickness of the article. Obviously the greater the penetration of the sulphur chloride and the quicker this penetration, the more uniformly will the rubber be cured. It is an observed fact that carbon bisulphide has the property of penetrating crude rubber to a remarkable degree. In fact, it stands preëminent among the commonly employed solvents in this respect, and it is on

account of its property of penetration that carbon bisulphide gives such satisfactory results in the sulphur chloride cure.

CARBON TETRACHLORIDE.

Carbon tetrachloride is made by the action of chlorine on carbon bisulphide, sulphur chloride (the curing agent) being produced simultaneously. Carbon tetrachloride is a heavy liquid of sweetish odor, boiling at 78 degrees C., and is not in the least inflammable. In fact, its vapors form a protective curtain around any burning article upon which the liquid is cast, a property of carbon tetrachloride which finds extensive application in the utilization of this substance as a fire extinguisher. Carbon tetrachloride is employed to a certain extent as a substitute for carbon bisulphide in the cold cure. Owing to its non-inflammability, and more agreeable odor, it has an advantage over carbon bisulphide, but from the standpoint of vulcanization, carbon bisulphide is the more preferable diluent. Somewhat more satisfactory results are obtained by using a mixture of carbon tetrachloride and benzol. This mixture is the closest approach in its properties to carbon bisulphide that has yet been found, but as a diluent for sulphur chloride could scarcely be said to be the full equal of it.

Egyptian Cotton in Arizona by Irrigation.

COTTON came into its own again in 1916 as a result of the war demand and Federal financial aid, yet the increased production of long-staple varieties was relatively small. Yarn spinners and fabric manufacturers have for several years past deplored the limited and uncertain supplies of American long-staple cotton, and last season was no exception. It now remains to be seen how long it will be before they take matters into their own hands and remedy the situation.

NEW UPLAND VARIETIES.

The production of long-staple cotton constitutes one of the great undeveloped agricultural resources of the United States and one that is capable of enormous expansion. For several years the industry declined because the boll weevil invaded the former long-staple districts of the lower Mississippi valley, but the introduction of early-maturing long-staple varieties by the United States Department of Agriculture and the tested fact that cotton can be grown by irrigation in undeveloped localities of the Southwest have injected new factors of far-reaching importance.

Such varieties as Columbia, Foster, Express and Durango, the latter grown extensively in Imperial Valley, California, can, by observation of the necessary precautions, be grown over a large part of the cotton belt, and are less subject to insect ravages than the older late-maturing varieties. Under improved cultural methods, with the aid of uniform conditions assured by irrigation, and by adoption of early-maturing varieties long-staple can now be grown more cheaply than in former years. While long-staple cotton for a period of several years past has averaged 60 per cent higher in price than corresponding grades of short staples, it can now be grown profitably at an average premium of 30 per cent. Undoubtedly the resulting tendency will be toward the substitution of higher-grade cotton in many classes of manufactured goods for which short staples, although now used, are but poorly adapted.

The earliness of these new varieties is represented not so much by the date when the bolls begin to open as by the setting of the crop in a shorter period of time after flowering begins. Contrary to the belief of many conservative planters, these varieties are nearly if not quite as productive as short-staple varieties with similar habits of growth; indeed, have outyielded them in many experiments. These advantages, coupled with the greater in-

trinsic value of the product, are tremendous arguments in favor of its culture, and with the steadily increasing demand for long staples the discouragingly wide price fluctuations of the past from season to season will surely be lessened, so that the long-staple planter need not fear finding himself at a disadvantage with growers of short staples.

PRECAUTIONS IN GROWING LONG STAPLES.

This is as it should be, for long-staple cotton growing requires not only more favorable natural conditions, but greater skill and care on the part of the producer, who is justly entitled to a greater reward. Successful long-staple cotton culture cannot be maintained by ordinary cotton-farming methods. Particular attention must constantly be given to maintaining stocks of pure seed by continued selection, avoidance of crossing varieties in the field, and admixture of seed at public gins, else the crop in two or three years will surely decline in quality as well as in quantity. Obviously degeneration will manifest itself more quickly than in short staples, because the requirements of uniform quality are higher.

COMMUNITY PRODUCTION ESSENTIAL.

Thus it becomes apparent that scattered individual efforts are precarious, and that success lies in community production of a single superior variety. Indeed, community organization is as essential to the maintenance of quality as to the marketing of the crop, and manufacturing interests entering the planting field do well to coöperate with such organized communities where a single long-staple variety is grown rather than to risk failure elsewhere. Egyptian cotton is therefore indicated in Salt River Valley, Arizona, and Durango, a long-staple Upland variety, in Imperial Valley, California.

EGYPTIAN COTTON IN SALT RIVER VALLEY.

It was to compete with Sakellarides, imported in great quantities, that experiments were begun in Egyptian cotton culture in Arizona in 1902. Ten years later the industry was inaugurated commercially, and proved successful. While it has not assumed large proportions, it promises to do so during the next few years because of virtually ideal conditions. Last year about 7,000 acres were under cotton and a well-balanced agriculture in Salt River Valley would permit 20 per cent of the total project, or 50,000 acres, producing as many bales annually. Similar con-

ditions exist in the Yuma Reclamation Project on the lower Colorado River, which includes a total of 100,000 acres, or 20,000 available for cotton. For the assistance of farmers a well-equipped experiment farm is maintained in each irrigated district by the Department of Agriculture.

In Egypt, cotton is grown entirely on irrigated land and in a climate practically rainless throughout the period of development of the cotton plant. This absence of rain, especially during the picking season, favors the production of clean cotton. Conditions in Salt River Valley, therefore, are substantially the same, except for the advantages of freedom from the boll weevil, pink boll worm and most other insect pests, and but slight occurrence of Hindi, or "weed" cotton contamination which renders difficult the maintenance of pure seed. Probably the higher valuation of land and cost of irrigation water in Egypt, together with less efficient hand methods of tillage, nearly if not quite offsets the higher cost of labor in America, which is felt chiefly in picking. As the crop-producing capabilities of the land in the two regions are much the same, and in staple and quality of fiber the commercial value of the Arizona crop compares favorably with the best of the Egyptian varieties, such as Jannovitch and Sakellarides, the difference to the American manufacturer lies chiefly in the freights, that by rail to New England from Arizona being normally about three times as much as from Egypt to America by water. There are several methods of surmounting this handicap, but a consideration of them is beyond the scope of the present article. Suffice it to say that comparatively little difficulty has been experienced thus far in disposing of the crop at satisfactory prices, due no doubt to the realization on the part of progressive manufacturers that new American sources of long-staple cotton should be developed and encouraged while in an experimental stage.



AN ARIZONA IRRIGATION CANAL.

YUMA COTTON.

Two varieties of uniformly high quality long-staple cotton known as Yuma and Pima are available for Arizona planting. Both were bred up by the Bureau of Plant Industry of the Department of Agriculture by selection from the Mit Afifi variety of Egypt, and are of a sort not available anywhere in Egypt. As segregated in 1908, the Yuma variety is distinct in the character of the plant and of the fiber. The lint ranges from 1 7/16 to 1 9/16 inches in length, according to soil and cultural conditions, and has the pale, pinkish buff color of Jannovitch cotton rather than the deeper buff color of the original Mit Afifi. The lint averages about 28 per cent. Yield and spinning tests during the past eight years have demonstrated that a stable variety, uniform in character and of good spinning quality, has been developed.

PIMA COTTON.

In 1910 another distinct type was segregated from the Yuma and given the name of Pima. This superlatively excellent new strain surpasses the parent variety in productiveness, size of the bolls, length and quality of the fiber, greater freedom from limbs, and general uniformity. The Pima fiber staples from 1 3/8 to 1 3/4

inches and is finer and lighter colored than Yuma. The upward vegetative branches are fewer and shorter, the fruiting branches, especially the lower ones, longer and better furnished with bolls. Because of these facts more light reaches the lower part of the plant, the crop matures earlier, the early bottom crop is heavier, and picking is easier. In lint percentage it differs but slightly from Yuma, the tendency being in favor of the latter. Spinning tests encouraged the substitution of this variety for Yuma, and during the season of 1916 it was grown for the first time commercially in the Salt River Valley. Seed enough to plant about 5,000 acres of this variety was produced, and by the spring of 1918 there will be seed enough to plant 100,000 acres or more.

SEED SUPPLY.

A Yuma seed supply of uniform quality is maintained by the Salt River Valley Egyptian Cotton Growers' Association under the supervision of Department of Agriculture experts. This cotton is grown in isolated places to prevent crossing, and under as nearly ideal conditions as possible. Early in July, soon after blossoming begins, every plant is examined and those of inferior quality are rogued to prevent contamination of others with their pollen. Thus the seed for general planting this year was derived from the fields rogued in 1915, and can probably be sold at only a slight advance above current oil mill prices. It is sufficient for 100,000 acres or more.

COTTON IN ROTATION WITH ALFALFA.

To be profitable, Egyptian cotton farming must be not a single crop culture, but part of a system of crop rotation in which alfalfa, for instance, is alternated occasionally with cotton. In past years, profit in alfalfa has depended upon growing livestock to consume it and involved heavy overhead expenses which cotton spinning and weaving companies have hesitated to assume. But the livestock industry of Salt

River Valley is assuming such proportions as to provide a ready market near at hand. Indeed, alfalfa occupies over half the irrigated land and is the basis of agricultural operations in that locality.

Cotton and alfalfa culture greatly benefit each other. Alfalfa brings a good cash return, puts humus into the soil and provides an ideal enrichment for subsequent cotton growing, while cotton renovates the soil of weeds. As a result of continued planting, alfalfa fields become badly infested with Bermuda and Johnson grass. One or two well-tilled crops of cotton, however, will leave the land in excellent condition again for alfalfa or for any crop, as the cultivation between the plants when young and the complete shading of the ground later in the summer kills weeds of every sort. Little, if any, more than half as much irrigation water per season is required for cotton as alfalfa, so that expansion of cotton culture in Salt River Valley may ultimately lead to extension of the irrigated area.

COST OF PRODUCTION.

Estimates of the cost of production have been prepared for the Department of Agriculture by W. S. Dorman, who has had over four years' growing experience in Salt River Valley, and

as president of one of the growers' associations has had access to all the facts. His figures, including interest on the land investment and deducting the value of seed produced, are as follows:

	Cost per acre of	
	Two-thirds	
Plowing, preparing soil, cultivating, and seed.	\$15.00	\$15.00
Irrigation water	1.50	1.50
Picking seed cotton.....	24.00	36.00
Transportation to gin.....	2.50	3.00
Ginning lint, at 2 cents per pound.....	6.72	10.00
Interest on \$150 at 8 per cent.....	12.00	12.00
Total cost	\$61.72	\$77.50
Value of cottonseed at 75 cents per 100 pounds	6.15	9.26

This shows the net cost of production per pound of lint as 16.66 cents when the yield is two-thirds of a bale per acre, and 13.65 cents when the yield is one bale per acre. On a 40-acre tract which yielded nearly a bale and a half to the acre in 1914, the cost was reduced to 12.37 cents. The detailed table which follows indicates the importance of securing large yields per acre if the industry is to be made profitable.

Item of cost.	Cost per acre.
Seed and tillage.....	\$15.10
Irrigation water	2.00
Picking 2,552 pounds of seed cotton, at 2 cents.....	51.04
Ginning, insurance, yardage, and association of ex- ..	
Interest and taxes.....	17.25
	\$101.37
Receipts for cottonseed	10.32
Net cost per acre	\$91.05
Lint per pound	cents 12.37

TILLAGE METHODS.

The best methods of preparing the land for Egyptian cotton and of irrigating and cultivating the crop have been described in detail by E. W. Hudson, of the Bureau of Plant Industry, in Farmer's Bulletin 577, for free distribution by the United States Department of Agriculture. Briefly, they consist in early and thorough preparation of the land; careful leveling, so that the entire field can be irrigated uniformly and with less water; early planting; getting the seed into moist soil; late thinning; leaving the plants close together in the row; the sparing use of irrigation water until the plants blossom; thorough cultivation as long as the size of the plants permits; and frequent light irrigation after blossoming begins until the crop is fully matured.

As Egyptian cotton requires a growing season of about nine months, or several weeks longer than Upland, and as cotton ripened in October and November is always superior to that ripened later, planting should occur as early in March as possible after the danger of frost is over.

PREPARATION OF THE LAND.

This implies early preparation of the land, which should be begun in the previous autumn and continued through the winter. Although some raw desert land will grow good cotton, land previously in alfalfa will produce better cotton more economically and with less irrigation, as the soil holds the water better and requires no separate irrigation of lighter spots. Such land

should be plowed 2 inches deep in October or November, turned up to the sun until thoroughly dry, and then plowed again in January 4 to 6 inches deep. Land to be planted a second time in cotton should be gone over with a stalk cutter and then plowed, disked and harrowed thoroughly. Preparation of new land infested with Bermuda and Johnson grass should be begun as early as August, followed in October or November, and again in January or February by deeper plowing, diskings, harrowing and cultivating to bring as many roots as possible to the surface. These should be raked up and burned. It may cost \$6 to \$10 an acre to clear new land.

PREPARATION OF THE SEED BED.

Land previously in cotton or grain, if irrigated before plowing, can be put in condition by one plowing. Land previously in alfalfa should be plowed twice. Late in February borders should be thrown up about 2 rods apart, and just before planting the land should be flooded and then disked and harrowed.

PLANTING.

Use a two-horse planter while the ground is still moist enough to insure seed germination and plant in rows 3 feet apart on new land or 4 feet apart on alfalfa land. Plant to an average depth of 1¼ inches with 40 to 50 pounds of seed per acre.

EARLY CULTIVATION.

Begin cultivation as soon as the plants are visible, in order to break any crusts that may have formed, to check evaporation, and to kill the weeds.

EARLY IRRIGATION.

New land may require water sooner, and three or four times before July 1, but alfalfa land after 6 to 8 weeks will require light furrow irrigation followed by cultivation as soon as the ground is dry enough to work, and again in 10 to 14 days. Repetition of this treatment after three or four weeks will be all the water required before July 1. Cultivation should follow any rains that occur.

THINNING.

After the second irrigation, when the plants are 8 to 10 inches high and have 10 to 12 normal leaves, they should be thinned to 4 to 6 inches apart in the row on new land and 6 to 16 inches on alfalfa land, depending on the richness of the soil. The idea is to obtain a uniform stand and consequent larger total yield. Thinning in two operations has the advantage of insuring enough plants to replace any that may be killed during later cultivation, and the comparative closeness of the plants until the final thinning favors the fruiting branches at the expense of the larger unproductive vegetable branches. Thinning can usually be contracted out at \$1 per acre.

LATE CULTIVATION.

Cultivation should continue every 10 or 15 days, as long as a horse can be driven between the rows without damage to the plants. After the plants have 8 to 10 leaves this should be so done as gradually to draw earth toward them until the plants are on a ridge 3 to 4 inches high and 12 to 14 inches wide. This insures more even distribution of water during the late irrigations and conserves moisture around the plants. After cessation of horse cultivation, the middle of the rows may be gone over once or twice with a single-row 7-shovel or spike-tooth cultivator.

LATE IRRIGATION.

From July 1 until after October 1, most soils require irrigating, not exceeding a 6-hour run, every 10 or 15 days to prevent wilting of the flowering plants during the middle of the day. The water should be drained off in each instance and not allowed to stand in the lower part of the field to damage both crop and land. At least two irrigations should be given after the first picking.

PICKING.

At least three pickings are necessary, and these should begin between September 15 and October 1, but not until 600 to 1,000 pounds of seed cotton per acre can be obtained. This is desirable in order to bring the second picking rather late in the season. Each picking, and any frosted cotton, should be kept separate in ginning and baling, as there is often a marked difference in grade. Picking Egyptian cotton requires greater care and is more expensive than picking Upland cotton because of the smaller size of the bolls and the necessity to keep the seed cotton clean so that the quality of the lint will not be impaired nor its selling value reduced. Then, too, no dependable cleaning device has been found which can be attached to the roller gin. Hand labor is neither abundant nor cheap in the Southwest, but Salt River Valley is better provided for than some other sections, because of the Pima and Papago Indians, two capable, industrious tribes which are taking up this work with satisfaction to themselves and their white employers. A force of 5,000 to 7,000 is available. Two cents per pound is the price paid, and pickers vary from 100 to 200 pounds a day according to aptitude and experience.

GINNING.

Four ginning establishments, each equipped with 10 roller gins, and devoted exclusively to ginning Egyptian cotton, are located at Phoenix, Tempe, Mesa and Chandler, while the cottonseed products are taken care of by two oil mills in Phoenix. The cost of ginning is usually somewhat less than \$10 a bale, although more than twice that of Upland cotton in the South. This is due to the fact that the roller gin used for the Egyptian cotton cannot be operated as rapidly as the customary saw gin, but improvements in the mechanism promise a considerable measure of relief in this particular stage of handling.

[In the preparation of the foregoing article we are indebted to Farmer's Bulletins and miscellaneous other circulars and papers prepared for the Department of Agriculture by C. S. Scofield, T. H. Kearney, C. J. Brand, O. F. Cook and W. T. Swingle, constituting the Committee on Southwestern Cotton Culture.]

H. Muehlstein & Co., scrap rubber dealers, New York City, celebrating their recent removal to new quarters, are sending out a neat souvenir in the form of a pocketbook which, while small enough to fit in the ordinary vest pocket, has a quite generous capacity. A bill fold with protective flap occupies the entire length of the three folds. The inside has a celluloid-covered card for filling out identification information of the owner, a section devoted to loose leaves for memoranda, with accompanying pencil, a small pocket containing a book for postage stamps and an enclosure for a year's monthly calendars. On the outside are four separate and distinct pockets for cards, tickets, memoranda, etc., one of these having a flap with ball and socket fastener. The advertisement of the firm is stamped in gold, thus forming a permanent reminder of the giver.

SEA ISLAND COTTON.

FARMER'S BULLETIN 787, by W. A. Orton, pathologist in charge of cotton and truck disease investigations of the Bureau of Plant Industry, United States Department of Agriculture, provides a comprehensive manual for the cotton planter, covering geographical distribution of Sea Island cotton in the United States; ideal crop requirements; possible extension of the Sea Island cotton producing area; markets; factors governing prices; defects in economic conditions; cultivation; fertilizers; preparation of the land; seed selection; handling the crop; diseases.

As to the possible extension of the Sea Island cotton-producing area the author writes:

There is little encouragement to offer to those who would attempt to introduce the culture of Sea Island cotton into other parts of the country than where it is now grown (South Carolina, Georgia, Florida). Many such trials have been made during the past hundred years, and all have failed. Even in the present area the crop is losing rather than gaining ground in competition with Upland cotton, although the production of Sea Island cotton might be increased if market conditions warranted.

In addition to the effect of high prices in stimulating the industry and of low prices in depressing it, a factor which must be considered in connection with the production of

cotton in either old or new sections is the supply of available labor. Until present methods are revolutionized a relatively large amount of fairly cheap labor is required, and it is a great advantage if the laborers have had long experience with the crop. Throughout the Sea Island cotton belt there is now a growing scarcity of labor, which is likely to restrict the acreage planted. The farmers must meet the new conditions by the adoption of labor-saving machinery in planting and in cultivation, but there will continue to be difficulty in getting the cotton picked.



EGYPTIAN COTTON GROWN IN SALT RIVER VALLEY.

The development of trucking and lumbering industries restricts the less profitable cotton crop, and there is a steady exodus of laborers to engage in railroad building, etc., making the labor problem still more serious.

Serious obstacles are met with in introducing Sea Island cotton into a new section. There is difficulty in securing the proper care in cultivation and in picking and handling the staple. Pickers accustomed to Upland varieties object so much to the small and partly closed Sea Island bolls that it is difficult to get the cotton picked even at the prices now paid—\$1 to \$1.25 a hundred pounds. The ginning must be done on a roller gin, as the saw gin injures the staple too much, and a specially equipped ginnery is therefore necessary. Further difficulties are met with in marketing the product, which at first can rarely be sold to advantage in a local market where the buyers are unaccustomed to the Sea Island staple. Shipment to a recognized market for Sea Island cotton is necessary in such cases. (Charleston, South Carolina; Savannah, Blackshear, and Valdosta, Georgia; Alachua and Madison, Florida).

In a recent campaign in Montreal, Canada, for the Patriotic and Red Cross funds, in charge of the One Day's Pay Committee, the total amount collected was over \$4,000,000, and of this \$12,089 was contributed by employees of the Canadian Consolidated Rubber Co., Limited.

The Manufacture of Jar Rings.

THE production of jar rings has assumed such proportions as to make it a most important branch of the rubber industry. The compounded stock from which the rings are made is generally run through a tubing machine, the outside diameter of the resultant tube being slightly larger than is required to offset the reduction in size when the tube is wrapped for curing. As the stock is run from the tubing machine it is cut off in lengths of about 30 inches. These are placed on steel mandrels and wrapped tightly with strips of wet cloth, after which the tubes are vulcanized in open steam for 30 minutes at 50 pounds pressure.

After curing, the tubes are removed from the mandrels by compressed air and at the same time each tube is forced by the same means over a special mandrel upon which the rings are cut. This mandrel, upon which the tube is mounted, is revolved in the lathe at a high rate of speed and the cutting is done by sharp steel blades mounted on a traveling carriage provided with a longitudinal feeding mechanism, the cutting blades being pressed against the revolving tube by a cam or other mechanism. The cut rings are stripped from the mandrel by compressed air and then inspected, counted and packed.

An important item in the successful cutting of jar rings is the cover for the cutting mandrels. This is usually made of brass that will not injure the cutter when it passes through the

vision is made for stopping the feed shaft to prevent over-feeding of the cutter carriage, and for shutting off the power when the carriage has reached the end of its forward travel.

COFFEY'S LATHE.

In Fig. 2 are shown the front and end elevations of this

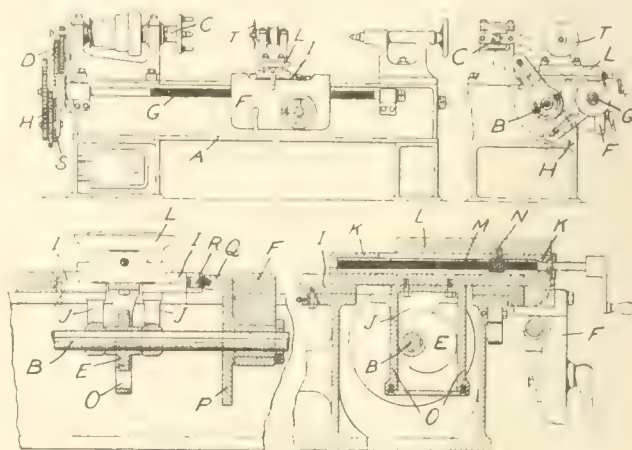


FIG. 2.—COFFEY'S LATHE.

machine. *A* is the lathe bed and *B* the cam shaft that moves the knife carriage to and from the work. Mounted on the bed *A* is the carriage *F*, which is moved longitudinally by a lead screw *G* driven from the spindle by change gears *H*. The rotary knife *I* is mounted on a short belt-driven shaft, that is journaled in the cross slide *L*, which is attached to the auxiliary slide *I* and the carriage *F*.

After the knife has been set in proper relation to the surface of the rubber tube to be cut, and the lathe started, one half a revolution of the cam will feed the knife to the required depth, while during the other half revolution the knife is withdrawn by the cam. The moment the knife has cleared the surface

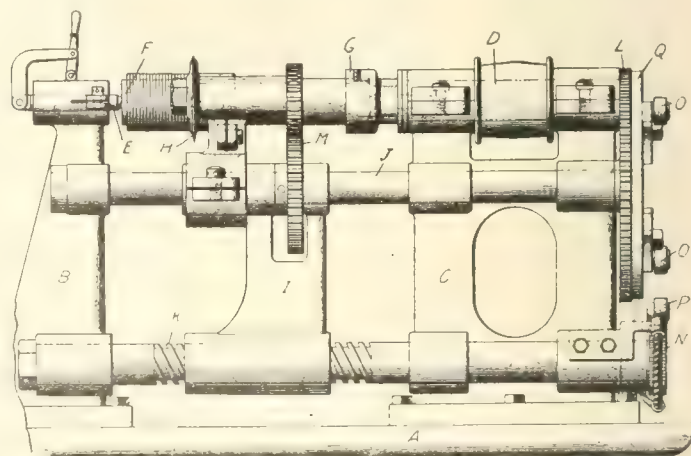


FIG. 3.—PIANAROSA'S ORIGINAL LATHE.

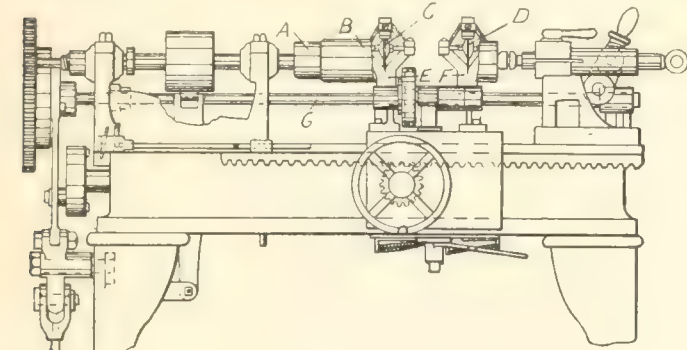


FIG. 1.—McGEOUCH LATHE.

rubber. This covering was formerly a cheap grade of rubber compound, rolled on the mandrel by hand and cured in the usual manner, after which it was dressed down to size on a speed lathe. Such a covering, however, becomes so badly cut after a short time as to be rendered useless. A substitute for this covering is one of tough stock, sheeted very thin on a calender and built up to the exact diameter of the mandrel. The uncured stock will stand more cutting than when cured, and when worn out it may be stripped from the mandrel, sent to the mill room and sheeted for further use. Paper tubes are also used.

There are several types of jar ring lathes and the principle is about the same in all. However, the more recent machines show marked improvement in design and construction that makes for greater production. Descriptions of the most important machines follow:

THE McGEOUCH LATHE.

The machine shown in Fig. 1 is designed for cutting two rings simultaneously. *A* represents the mandrel upon which is placed the rubber tube *B*, and *C* and *D* are circular knives mounted on shafts which are journaled in the swinging arms *E* and *F*. The knives are moved into engagement with the tube *B* by a cam on the shaft *G*. After the two rings are cut, the cutters are held in operative position while the knife carriage is moved longitudinally a distance equal to the thickness of the rings. Pro-

of the rubber, the carriage is moved longitudinally the required distance to bring the knife in position for the next cut.

THE ORIGINAL PIANAROSA JAR RING LATHE.

The jar ring cutting lathe, shown in Fig. 3, differs in design from the usual type. The feature of this lathe is an elliptical rotary cutter by means of which the rings are cut with very smooth surfaces. The drawing shows a front elevation of the machine. Secured to the bed *A* are the stands *B* and *C*. In

the stand *C* is journaled the driving shaft *D* and in the stand *B* is an adjustable center *E* which supports one end of the mandrel *F*, the other end of which is centered in the chuck *G* on the end of the driving shaft *D*. *H* is an eccentric rotary knife journaled in an adjustable bearing attached to the knife carriage *I*. This carriage slides on the shaft *J* and is moved

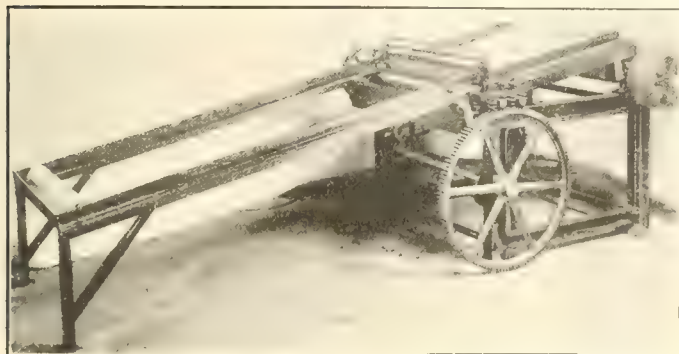


FIG. 4.—AUTOMATIC TRIMMING AND WRAPPING MACHINE.

longitudinally by the screw shaft *K*. The shaft *J* is driven from the driving shaft *D* by spur gears *L* and the cutting knife is revolved by means of the gears *M*. An intermittent feeding movement is given the threaded shaft *K* by means of the ratchet wheel *N*. This ratchet is turned a short distance each time one of the rollers *O* strikes a roller *P* on the pawl carrier. The strikers *O* are mounted on a disk *Q* on the end of the shaft *J*. The operation of the machine is as follows: The mandrel with the rubber tube upon it is placed in position, the knife support is adjusted and power is applied to the driving pulley, which revolves the mandrel and also the elliptical knife. When that part of the knife of the least radius comes opposite the tube on the mandrel, the feed shaft *K*

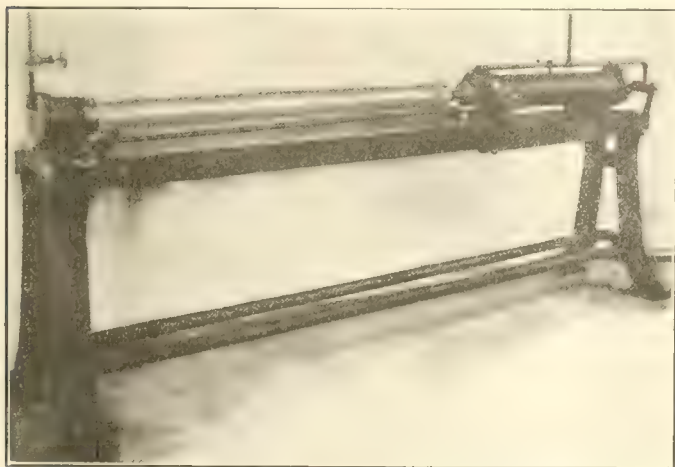


FIG. 5.—"PUSH" MANDREL MACHINE.

moves the knife carriage *I* lengthwise a distance equal to the thickness of the ring required. In this way the tube is cut into rings while the knife is in constant rotation.

Further development of the principle embodied in the above original invention has resulted in the following complete line of highly specialized machines for the manufacture of jar rings.

THE IMPROVED PLANAROSA JAR RING MACHINES

These machines show the progress that has been made in specialized machinery used in modern rubber mills for the manufacture of jar rings. They include an automatic machine for trimming and cloth wrapping the unvulcanized tube on the

curing mandrel; a machine operated by compressed air that removes the cut rings and at the same time forces another uncut tube upon the same mandrel; a duplex jar ring lathe that automatically cuts the rings; and a special alternating grinding machine for grinding the elliptical cutters.

The uncured tube on its mandrel is placed in the right-hand end of the machine shown in Fig. 4, and the ends of the tube are accurately squared and at the same time the length determined by automatic cutters. The tube is then placed on the wet wrapper and the end brought over the tube when it is released and rolls down the incline by gravity—thereby loosely wrapping itself—to the two parallel gear driven rollers on which it rests. The upper presser roller, being automatically raised to permit the entry of the wrapped tube, is now brought down in contact with it, the power applied and after 16 revolutions the cloth is smoothly and evenly wrapped around the tube. The upper presser roller is then released and the wrapped tube rolls down the inclined plane to the end of the machine and is ready for curing.

After the tube has been vulcanized, it is blown off the mandrel by compressed air and placed on the cutting mandrel by the

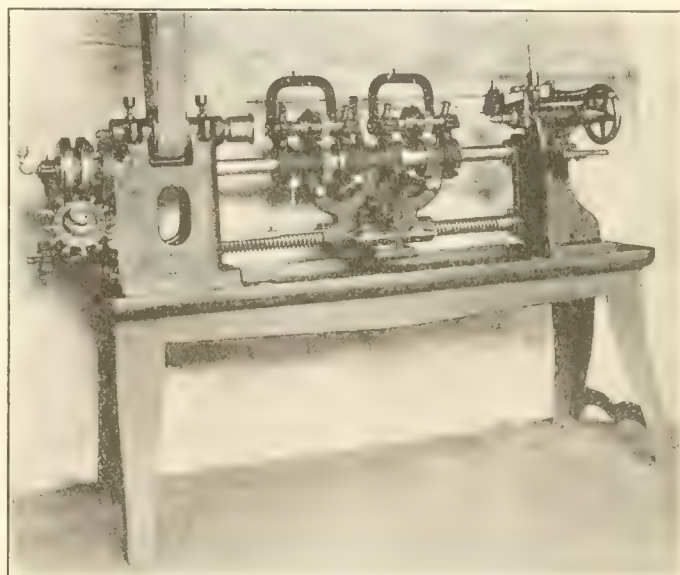


FIG. 6.—AUTOMATIC JAR RING LATHE.

machine shown in Fig. 5. This machine serves a double purpose by removing the cut jar rings from the mandrel and at the same time applying another tube to the same mandrel.

This "push" mandrel machine consists of a horizontal cylinder containing a piston that is operated by compressed air. A mandrel and tube that has been cut on the jar ring lathe is placed on the concave bed of the machine and the end adjusted to the outer end of the piston. One end of an uncured tube is slipped over the free end of the mandrel, the other tube end being attached to the automatic compressed air valve shown at the extreme left of the illustration. Compressed air is automatically released by this valve and rigidly distends the tube while the piston is operated, forcing the mandrel into the uncured tube and at the same time removing the cut rings.

The jar rings are cut on the automatic lathe shown in Fig. 6, the mandrel being placed between the centers and revolved at a fixed speed. The cutting is performed by two rotary, elliptical knives or cutters mounted on separate carriages that are driven in the same direction by a lead screw. The knife on the right starts on the right end of the tube and cuts to the left, while the other knife starts at the center and cuts in the same direction. There is no reciprocatory motion, which is the most important feature, as it permits running the machine

at a very high rate of speed. The cutting is done by the edge of the part of the elliptical cutter with the greatest radius revolving against the work. As it revolves, the cut is finished and when the part of the cutter with the least radius arrives opposite the revolving mandrel, clearance is thereby provided and the carriages are moved longitudinally for a fresh cut. The movement of the carriages that determines the thickness of the jar rings is automatically controlled by an intermittent worm gearing and star wheel mechanism together with change gears. When the cutting is completed, the machine is stopped automatically. It is claimed that this machine will pro-

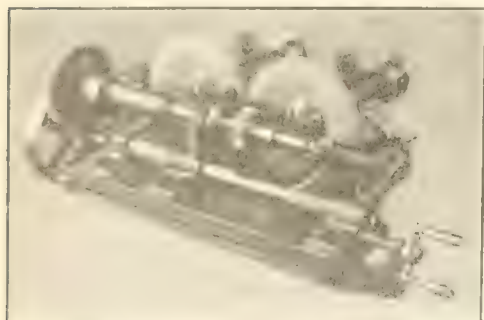


Fig.

placed, belt-driven emery wheels that travel toward each other. At right angles to the emery wheel shafts are the rocking centers between which the cutter arbor and cutter to be ground is placed. The arbor is revolved by belt-driven gearing and at the same time being rocked by a cam movement so that the elliptical edge of the knife is presented to the rapidly revolving emery wheels and accurately ground.

WASTE MATERIAL DEALERS MEET.

THE fourth annual meeting and dinner of the National Association of Waste Material Dealers was held at the Hotel Astor, New York City, March 20 and 21. Louis Birkenstein, of S. Birkenstein & Sons, Chicago, Illinois, and New York City, officiated at the meeting, and in his address gave an enthusiastic account of the four years' history of the association. The election resulted in the choice of the following officers: Louis Birkenstein, president; H. H. Cummings, James Rosenberg, E. A. Stone, Henry Lissberger, Ivan Reiter and James J. Ryan, vice-presidents; Mark Sherwin, treasurer; Charles M. Haskins, secretary.

At a meeting of the Scrap Rubber Division held March 20, with Paul Loewenthal, of Brooklyn, New York, chairman, it was voted that The Rubber Association of America, Inc., be requested to have a committee meet the Classification Committee of this division for the purpose of drawing up specifications of scrap rubber which would be adopted by both organizations and should be standard for the trade; and that the secretary address a letter to the Rubber Association along the lines of the above motion.

There was considerable discussion as to the buying of mixed tires, the consensus of opinion being that this was a matter which would have to remedy itself and that there was no way for this association to control the buying of its members.

President Birkenstein also presided at the banquet held on the evening of the twenty-first, and made a ringing address which was enthusiastically applauded. Joseph F. McLean, of the Pequannoc Rubber Co., Butler, New Jersey, spoke of the valuable services which the waste material industry is rendering the country's manufacturing interests, alluding to the friendly relations existing between the rubber reclaimers and the scrap rubber trade. Hon. E. C. Stokes, former Governor of New Jersey, gave

a very interesting and witty address and a fine eulogy of the waste material industry.

A pleasant feature of the occasion was the presentation of a handsome silver loving cup to President Louis Birkenstein by the members of the executive committee.

A. S. T. M. RUBBER NOMENCLATURE.

THE American Society for Testing Materials will hold its annual meeting in Atlantic City, New Jersey, during the week beginning June 25, 1917. In accordance with a resolution passed two years ago, there has been appointed a sub-committee on "Definitions for Rubber Products and Nomenclature of Crude Rubber Varieties," with Dr. Frederic Dannerth as chairman. This committee will present a preliminary report of its work at the June meeting.

The committee has prepared the following list of terms, and it is desirous of securing criticisms from the technical men of the rubber industry, with special regard to any additions or omissions which should be made.

GROUP I.		GROUP III.	
Para rubber		Green stock	
Machine smoked sheets		Rubber cement	
First latex crepe		Vulcanized rubber	
Brown crepe		Friction compound	
Crude rubber		Skim ply	
Washed and dried rubber		Cushion	
Rebined or broken-down rubber		Bead	
		Tread	
GROUP II.		GROUP IV.	
Scrap rubber		Rubber hydrocarbon	
Reclaimed rubber		Synthetic rubber	
Alkali reclaimed rubber		GROUP V.	
High-grade reclaimed rubber		Balata	
Floating reclaimed rubber		Chicle	
White substitute		Gutta percha	
Brown substitute		Pontianak	
Rubber resins		Assam rubber	
Pitch hydrocarbon		Caueho ball	
		Castilla rubber	
		Manicoba rubber	
		Mangabeira rubber	
		African rubber	
GROUP VI.			
Plantation Para rubber		India rubber	
Fine hard cure Para		Caoutchouc	

The object of the committee in preparing this list of standard terms used in the American rubber industry is to place on record approved definitions for these terms as they are recognized in the American rubber trade, at this time.

The definitions should represent trade usage; should contain no historical matter; should be so clear and concise that they can be used in case of dispute between buyer and seller; should be adopted for use in expert testimony for the courts.

As an example of the value of such standard definitions the committee mentions the case of balata, which is at present imported as rubber (free of duty), while chicle pays a duty of 15 cents and 20 cents. The tendency in such cases is to enter chicle under the name of balata.

NEW JERSEY ZINC CO.'S ANNOUNCEMENT

The New Jersey Zinc Co., New York City, announces the following prices on Florence brand, French process, zinc oxide, for shipment on contract, during the second three months of 1917:

	Carloads.	Less Carloads.
White Zinc Oxide	16	16
Green Zinc Oxide	15	15
Red Zinc Oxide	15	15

The above prices are based upon shipments in barrels f.o.b. shipping point with freight allowance as heretofore on carload lots only. The above prices are effective April 1, 1917, and are subject to change without notice.

The Composition of Klingerit Steam Packing.

IN connection with the article descriptive of the manufacture of high-pressure steam packing on page 322 of the March 1, 1917, issue of THE INDIA RUBBER WORLD, the following analysis of the composition of Klingerit by André Dubosc in "Le Caoutchouc & la Gutta-Percha" is of interest.

Klingerit is a pasteboard of amianthus (flexible asbestos), formed of a series of thin leaves spread on both sides with an agglutinant having a basis of rubber and balata. These leaves are assembled and when subjected to very powerful pressure in a special calender, give an exceedingly homogeneous pasteboard.

By subjecting the Klingerit, cold, to the action of a suitable inflator, the rubber and balata with which the sides of each leaflet are coated, can be transformed into a non-adhesive jelly which will easily permit the separation, the numbering and the examination of the loose leaves after desiccation in the drying oven at 100 degrees.

A portion was allowed to swell in a mixture of equal parts of sulphuret of carbon and of tetrachloride of carbon. After remaining in this mixture for four hours, the rubber serving as an agglutinant was completely swollen and it was then easy to separate the sheets which composed the pasteboard.

In a sheet of Klingerit board having a thickness of 3.75 millimeters, 15 leaflets, each of a thickness of 25/100 of a millimeter, were then separated.

The cardboard being 3.75 millimeters thick, the composition $\frac{25}{100} \times 15 = 3.75$ mm.) was found to be correct.

The leaves thus separated were subjected to a microscopic examination; they consist of a felting of long amianthus fibers mixed with about 2 per cent of (cellulose) organic fibers, very much elongated, hollow and imperceptibly attenuated at both ends, colorable after washing with methylene blue and ruthenium red—these do not color the amianthus—with thick walls limiting a fairly large cavity and of a generally uniform diameter.

These are flax fibers mixed with amianthus with a view to giving the thin paper of which the leaflet is constituted, a resistance sufficient to endure the process of coating.

Each leaflet is covered on both sides with a reddish solution applied with a spreader and composed of a mixture of rubber and balata to which is added a very small quantity of sulphur, and dissolved in a suitable solvent, benzine or gasoline.

This varnish represents the agglutinant element in the Klingerit joint and owing to the way in which it is applied, it is easily understood that its distribution in the mass is perfect and that it insures complete cohesion of the various thin leaflets which compose the pasteboard. This is in the main composed of an alternating series of very thin leaves of amianthus and flax, 25/100 millimeter thick, held together by very thin layers of a mixture of rubber and balata to the number of 30; each layer is about 5/100 millimeter thick.

Klingerit, as it is put on the market, is not vulcanized, but contains a sufficient amount of sulphur to allow the rubber and balata to vulcanize when the joint is exposed to heat while in place. Thus a perfect resistance and tightness of the system is insured for the leaflets of amianthus cannot then be reached by the liquids that would induce physical decomposition in them. The most important element of this cardboard is the amianthus.

A sample subjected to incineration leaves 80.463 per cent of ash, which cannot be corroded by acids and is composed of large amianthus fibers which preserve their morphological structure entirely. The ash when chemically analyzed, was found to be composed exclusively of the finest commercial quality of long-fiber amianthus.

In order to estimate the quantity of flax cellulose mixed with the amianthus fiber we converted this cellulose into acetate of cellulose, subjecting it to the action of acetic anhydride and of glacial acetic acid together with some drops of sulphuric acid, used as a catalyst. The reaction took four hours, the liquid being maintained at 60 degrees. After filtration on glass-silk, the solution of acetate of cellulose formed was precipitated by a great afflux of water. The acetate was separated by filtration on a tared filter, washed until perfect neutralization was attained, dried in a sulphuric vacuum and weighed; from the weight of the acetate of cellulose considered as a triacetate, the cellulose content was deduced as 2.237 per cent.

The analysis of the agglutinant is more delicate because it is

composed of a mixture of rubber and balata which is rather difficult to separate.

We have observed that if in such mixtures a solvent composed of freshly distilled sulphuret of carbon and 5 per cent of absolute alcohol be used, the rubber dissolves rapidly while the balata remains insoluble; the reaction must take place in a cold state. By evaporating the solvent in a tared vessel, it is possible, for a given weight, to ascertain the amount of rubber contained. This content has been found to equal 5.185 per cent.

The pasteboard resulting from the preceding exhaustion was then treated with chloroform in a warm state in a Soxhlet apparatus until the solvent passed without any coloration.

This exhaustion took 8 hours, the first passages being strongly colored violet.

The chloroform, transferred to a tared vessel, was distilled and the residue of balata which was determined by the usual methods, was weighed after desiccation to constant weight in the sulphuric vacuum.

The balata content was 11.975 per cent.

The agglutinant is therefore composed of:

Balata ...	11.975 per cent	{ 17.160 per cent.
Rubber ..	5.185 per cent	

The quantity of sulphur was found, according to the Henriquez method, by disintegrating the board with smoking nitric acid saturated with bromine. A sulphur content of 0.127 per cent was found.

This figure is low, but because of the inflation of the amianthus caused by the nitric acid, it is very difficult to obtain a perfect disintegration, even if large quantities of nitric acid are employed. Another test made with peroxide of sodium, yielded the higher figure of 0.257 for sulphur, which seems more probable.

In constructing Klingerit we advise the use of 5 per cent of sulphur in proportion to the quantity of rubber and balata.

According to these tests the composition of Klingerit resolves itself into:

Amianthus	80.463 per cent	{ Balata 11.975 per cent
Cellulose (flax).....	2.237 per cent	
Sulphur	0.127 per cent	
Water	0.033 per cent	

100 per cent.

RUBBER IN PLASTIC CEMENTS.

A RECENT review of plastic cements, in "Metallurgical and Chemical Engineering," collects and classifies several of the more valuable formulas and suggestions, gained both from experience and current literature, regarding this class of adhesives. The general methods of plastic cement application, as varied to suit special cases, are stated by the author, J. B. Barnitt, who devotes the following section to rubber:

Because of its toughness, elasticity and resistance to alterative influences, rubber is a very useful cement.

As a leather cement:

(a) Asphalt, 1 part; rosin, 1 part; gutta percha, 4 parts; carbon disulfide, 20 parts.

As a resistant to acid vapors:

(b) Rubber, 1 part; linseed oil, 2 parts; fireclay, 3 parts.

A plain rubber cement:

(c) Cut crude rubber in small pieces and then add carbon disulfide or benzol, allowing the rubber to dissolve.

Corks and wood are made impervious to water by soaking them in the above solution.

The use of rubber in calking cements in conjunction with pitch is also noted:

Plastic cements for calking must be both tough and elastic and have the added property of expanding and contracting with the joint to which they are applied:

(d) Pitch, 3 parts; shellac, 2 parts; pure crude rubber, 1 part.

(e) Pitch, 1 part; shellac, 1 part; rubber substitute, 1 part.

(d) and (e) are mixed by melting over a burner.

Port Sunlight, a Model Industrial Village.

By John Barnard, Architect.

THE movement for the better housing of employes, which is occupying the serious attention of leading minds in the rubber, cotton weaving and other great American industries, had its inception in England several years ago. Such garden villages as Port Sunlight, Bourneville, Hampstead and the like are not without their philanthropic aspects, usually providing home comforts and advantages which the operatives had never known before. But they have proved to be a paying investment to the employer, a factor which several American manufacturers were quick to make the most of.

Many firms that must house their employes have discovered that the cost of doing so well is only a little more than being niggardly in the matter, and that the accruing benefits more than offset the additional investment. But the mere housing, however well it may be done, does not provide the only essential to a full measure of success in such a venture. Community spirit, recreation facilities, educational and other welfare features are also important, particularly in locations somewhat removed from any long-established town or city. Therein lies the principal advantage of the English model industrial village over most of the merely real estate developments for American operatives. The

English tavern, offers good rooms and meals at moderate prices for traveling men and other visitors. The museum contains



A FIVE-FAMILY TYPE OF BRICK.

many fine paintings, pieces of sculpture and furniture which have been donated and is a refining influence in the community. Modern in every respect, the hospital takes care of factory accidents and any sickness in the village. Adjacent to the Gothic church of stone lies the cemetery, after the old English manner.

The dwellings, set well back from the street, are mostly of the semi-detached type, from two to ten in a block, four to six being the usual number. Cheaper labor and materials in England, together with the omission of cellars, have made permanent fireproof construction possible. Coal and wood are stored in a small scullery off the kitchen, and there the laundry work is done.



SEMI-DETACHED HOUSE, ONE OF THE TWO TYPES. TIMBER, THE OTHER WITH SLATE WALLS.

inhabitant of such a town enjoys many interests and benefits in common with his neighbors, and in every sense becomes a citizen with the opportunity to take part in the management of village affairs.

Take Port Sunlight, near Liverpool, England, for instance. There, in a setting of delightfully shaded, curving streets, well-kept lawns, ample shrubbery and beautiful flowers, nestle many attractive houses picturesquely grouped and overgrown with ivy. Scattered here and there among them are the community buildings, including a church, inn, school, hospital, museum, social hall, library, swimming pool, playground, gymnasium, stores, etc. The Sunlight Soap Co. also has a bank and coöperative association giving employes an opportunity to save money and buy stock in the company. Flower gardens here and there beautify the picture and provide the outdoor exercise so essential to the health of factory workers, while vegetable gardens, often in tracts of land by themselves divided in squares for the use of separate families, are important factors in reducing the cost of living. Rivalry as to the best gardens is often very keen. Here as elsewhere hedges are usually employed for division lines.

Of the community buildings, the inn, modeled after an old



A SIX-FAMILY TYPE OF BRICK AND STUCCO.

Most of the houses have lower stories of brick with brick party walls, and upper stories of oak framing filled in with brick or terra cotta and plastered with cement. Some, however, have slate-covered walls over a wood frame, while others have stucco exteriors with no timber-work showing. All roofs are of slate.

[This is the second of a series of articles devoted to the better housing of employes. Editor.]

What the Rubber Chemists Are Doing.

JOINT RUBBER INSULATION COMMITTEE'S SPECIFICATION FOR 30 PER CENT HEVEA RUBBER COMPOUND (CHEMICAL CLAUSES).

THE following specifications and explanations are from the report of the Joint Rubber Insulation Committee, published in full in "The Journal of Industrial and Chemical Engineering" (March, 1917). The analytic procedure was outlined in THE INDIA RUBBER WORLD (November 1, 1916).

SPECIFICATION.

1. A 30 per cent fine Para or best quality plantation *Hevea* rubber compound with mineral fillers shall be furnished. It shall contain only the following ingredients: (1) rubber; (2) sulphur; (3) inorganic mineral matter; (4) refined solid paraffin or ceresin.

2. The vulcanized compound shall conform to the following requirements, when tested by the procedure of the Joint Rubber Insulation Committee, results being expressed as percentages by weight of the whole sample.

REQUIREMENTS INDEPENDENT OF THE AMOUNT OF RUBBER FOUND.

	Maximum.	Minimum.
Rubber	33	30
Waxy hydrocarbons	4	..
Free sulphur	0.7	..

Red lead, carbon, or organic fillers shall not be present.

REQUIREMENTS DEPENDENT UPON AMOUNT OF RUBBER FOUND.

(Requirements for intermediate percentages shall be in proportion to the percentage of rubber found.)

	30 PER CENT RUBBER COMPOUND.		33 PER CENT. RUBBER COMPOUND.	
	Maximum.	Minimum.	Maximum.	Minimum.
Saponifiable acetone extract..	1.35	0.55	1.50	0.60
Unsaponifiable resins	0.45	..	0.50	..
Chloroform extract	0.90	..	1.00	..
Alcoholic potash extract.....	0.55	..	0.60	..
Total sulphur (Note 2).....	2.10	..	2.30	..
Specific gravity .....	..	1.75	..	1.67

3. The acetone solution shall not fluoresce.

4. The acetone extract (60 cc.) shall be not darker than a light straw color.

5. Hydrocarbons shall be solid, waxy and not darker than a light brown.

6. Chloroform extract (60 cc.) shall be not darker than a straw color.

7. Failure to meet any requirement of this specification will be considered sufficient cause for rejection.

8. Contamination of the compound, such as by the use of impregnated tapes, will not excuse the manufacturer from conforming to this specification.

NOTE 1. This specification shall be supplemented by appropriate clauses relating to tensile strength, elasticity, electric insulation resistance and dielectric strength. (See the Wire and Cable Specifications of the American Society for Testing Materials, the Association of Railway Electrical Engineers, etc., for examples of such clauses.)

NOTE 2. The limit on total sulphur may be omitted at the option of the purchaser.

EXPLANATION OF SPECIFICATION.

Experience has shown that compounds of the grade which contains only good *Hevea* rubber, may be relied upon to be more permanent than those made of rubber of other grades. It is not affirmed by the committee that a compound which conforms with this specification is necessarily permanent, or that a better compound cannot be made, but it is believed that enforcement of the specification will limit the use of inferior materials and that it will put the manufacturers more nearly upon equality of endeavor, where they can use their experience to obtain the best

results. Used in connection with the analytic procedure, the specification will enable purchasers to order a good compound and to ascertain, with a greater certainty than heretofore, whether the material received represents the compound specified.

The term *Hevea* applied to rubber means rubber from the *Hevea Brasiliensis* tree, whether wild or cultivated and regardless of the locality in which it has been grown. Para rubber is *Hevea* rubber of the kind originally shipped from the port of Para, Brazil, and comes in several grades. The rubber required by this specification should be *Hevea* rubber of good quality, such as fine Para or best quality plantation rubber.

Carbon is excluded, not only because it is considered, by some purchasers, to be deleterious, but because it interferes with the determination of rubber hydrocarbons.

Red lead is excluded because of the possibilities of its deleterious effects on rubber.

Ozokerite is prohibited because the acetone extract obtainable from it interferes with the separation of the acetone extract obtainable from the rubber, thereby vitiating the assay of the rubber extract. This prohibition is unimportant to the manufacturers, as ceresin, which is permitted, is the essential constituent of ozokerite.

An upper limit is placed upon the rubber in order to prevent the attainment of electrical and mechanical strength by the use of an extra quantity of inferior rubber whose lasting qualities might not be satisfactory.

The hydrocarbons are limited, owing to their tendency to separate from the compound and thus cause porosity.

The free sulphur is limited because an excessive amount may be deleterious.

The maximum limit on the saponifiable acetone extract is to prevent the use of raw or reclaimed rubber with high saponifiable extract. The medium limit assists in forcing the use of *Hevea* rubber, since it is characteristic of the acetone extract from *Hevea* to be largely saponifiable.

The unsaponifiable resins are limited because a low proportion of unsaponifiable resins is characteristic of *Hevea* rubber. A high result might be due to the presence of reclaimed rubber.

The chloroform extract is limited, first to prevent the use of bituminous substances, and, second, to limit depolymerized and under-cured rubber.

The alcoholic potash extract is limited to prevent the use of saponifiable rubber substitutes.

The specific gravity is limited to reconcile the specification of ingredients by weight with the practice of purchasing material by volume.

Fluorescence of the acetone solution is prohibited, as it indicates the presence of bituminous substances, rosin oil or mineral oils.

The color of the acetone extracts is specified to conform with the normal color of the extract of *Hevea* rubber. A darker color indicates adulteration or an inferior grade of rubber.

The hydrocarbons are required to be solid in order to prevent the use of oils and paraffin of low melting point. The shade required is that obtained from paraffin wax or ceresin. Liquid hydrocarbons indicate reclaimed rubber softened with mineral oil, or paraffin of low melting point.

The color of the chloroform extract is specified to conform with the color of dissolved gum in small quantities. The presence of bituminous substances would be indicated by a brown or black color.

It would be desirable that the sulphur of vulcanization be limited to exclude reclaimed rubber, which contains the sulphur of its previous vulcanization, but the committee has not yet developed an acceptable method for determining this quantity. It

is, therefore, confronted with the choice of either placing a limit on the total sulphur or giving up the attempt to exclude shoddy by sulphur limitation. Option is, therefore, given to the purchaser to insert or omit the limit on total sulphur. Such insertion will at times exclude reclaimed rubber and the committee believes it possible to make a suitable compound with this limitation. The committee thinks that a sulphur limit positively excluding reclaimed rubber, would place too great a hardship, in other ways, on the manufacturers. Where the specification is used with no total sulphur limit, the use of many kinds of, or much reclaimed rubber, will be guarded against by the limits of the various components of the acetone extract. When the limitation on total sulphur is omitted, sulphur-bearing fillers, which possess certain advantages, may be used.

This specification should be supplemented by appropriate elasticity and tensile strength tests, in order to add to the assurance that good rubber has been used and that the vulcanization process has been properly carried out; also by appropriate electric stress and resistance tests, to assure proper insulating qualities and homogeneity of structure. The exact value of the limits for these tests will depend upon the use to which the material is to be put.

IMPORTANT SPECIFICATIONS CONTAINING THE JOINT RUBBER INSULATION COMMITTEE'S CHEMICAL CLAUSES OR ANALYTICAL PROCEDURE.

AMERICAN ELECTRIC RAILWAY (ENGINEERING) ASSOCIATION: Standard Specification for Rubber Insulated Wire and Cable.

AMERICAN SOCIETY FOR TESTING MATERIALS: Proposed specifications for Insulated Wire and Cable; 30 per cent *Hevea* Rubber.

ASSOCIATION OF RAILWAY ELECTRICAL ENGINEERS: Standard Specifications for Wire and Cable.

INTERBOROUGH RAPID TRANSIT CO., MOTIVE POWER DEPARTMENT, NEW YORK: Specification No. 2.

NEW YORK CENTRAL RAILROAD CO., ELECTRICAL DEPARTMENT: Specification No. 300.

PANAMA CANAL: Office of General Purchasing Agent, Circular No. 1,038.

SIGNAL CORPS, U. S. ARMY: General Specification No. 581-A, etc.

ALUMINUM NAPHTHENATES.

The properties and method of obtaining aluminum naphthenate is described by G. Nothe in "Le Caoutchouc & La Gutta Percha" (November, 1916). Pure naphthenic acid from Baku petroleum, when treated with alumina, yields aluminum naphthenate, which, according to the method employed, may be a powder or a colloidal mass, very elastic and plastic, not unlike factis. The material is used in rubber mixings and vulcanizes readily. German pneumatic tire manufacturers largely use such a naphthenate manufactured by the E. de Haën Co. Aluminum naphthenate is nearly insoluble in acetone, and gives with chlorides of hydrocarbons very viscous colloidal solutions forming transparent films of great strength. By using a sufficient quantity of solvent the gel which first forms, gives, on gentle heating, faintly yellowish fluid solutions, miscible in all proportions with cellulose acetate producing strong films. The Germans have utilized this material in large quantities as a substitute for rubber, mixed with reclaimed rubber in the manufacture of pneumatic tires during the war.

CEARA RUBBER FROM NIGERIA.

Two samples of Ceara rubber are reported by the Bulletin of the Imperial Institute (1916, volume 14, pages 382-384). These samples were rough sheets prepared from latex tapped by the Lewa system from trees growing in the government plantation at Ankpa, Bassa, Northern Provinces, Nigeria. The physical properties of the samples were satisfactory and the analytical results showed loss on washing: 5.3 and 8.0 per cent on original sample; and caoutchouc, 83.1 and 84.7; resins, 5.3 and 6.3; protein, 9.9 and 7.7; ash, 1.7 and 1.3 on the dry-

washed rubber. A comparison of the second sample with plantation Para sheet, with regard to their behavior on vulcanization gave the following results: Time of cure at 50 pounds steam pressure, Ceara 50 minutes, Para sheet 70 minutes; tensile strength 2,330, 2,300-2,400 pounds per square inch; elongation 847-875 per cent. The ages of the trees from which the two samples were obtained were, respectively, three years and three to four years, their average girth being 15 inches and 18 to 20 inches at three feet from the ground. [Journal Society of Chemical Industry, January 31, 1916.]

FREE AND COMBINED SULPHUR IN VULCANIZED RUBBER

B. J. Eaton and F. W. F. Day in "The Journal of the Society of Chemical Industry" (January 15, 1917), recount their research on a "Preliminary Investigation on the Estimation of Free and Combined Sulphur in Vulcanized Rubber, and the Rate of Combination of Sulphur with Different Types of Plantation Para Rubber." They found it necessary to devise a special method for sulphur determination in vulcanized rubber. After protracted acetone extraction, combustion of the extracted rubber is effected in oxygen under special conditions. The authors state that the combustion method described would be inadmissible for estimating sulphur in vulcanized mineral mixings, although it enables them to balance the free sulphur and the combined sulphur against the total sulphur and against the original sulphur put into the mixing investigated. This mixing was 90 per cent rubber and 10 per cent sulphur. Three types of rubber were investigated, namely slab, sheet and crêpe. All of these samples were prepared from similar latex and under identical conditions except as to machining. It was concluded that "the percentage of combined sulphur at the optimum time of cure is practically the same for all three types, and this percentage of sulphur at the optimum time of cure is always about 4 to 4.5 per cent, calculated on the mixing. Whether this will be so for all samples remains to be seen."

CHEMICAL PATENTS.

INSULATING COMPOSITION. Phenol condensation compound and solvent. Leo H. Bakeland, Yonkers, New York, assignor to General Bakelite Co., New York City. [United States patents Nos. 1,216,265 and 1,216,266.]

RUBBER COMPOSITION AND PROCESS. The process of making rubber compositions which comprises working together rubber, a dry sulphite waste liquor preparation, a composition of blown petroleum and asphalt, and other body-giving components. [Michael F. Coughlin, Boston, Massachusetts, assignor to American Gum Products Co., Covington, Virginia. United States patent No. 1,217,157.]

SHOE FILLER COMPOSITION. A filling material for shoes comprising a solution of rubber in a solvent, comminuted cork, carbon tetrachloride, and sulphur, the proportions being such that the resulting mixture is plastic and adapted to vulcanize quickly when spread on the bottom of the insole of a shoe. [Adam H. Prenzel, Halifax, Pennsylvania, assignor to United Shoe Machinery Co., Paterson, New Jersey. United States patent No. 1,217,214.]

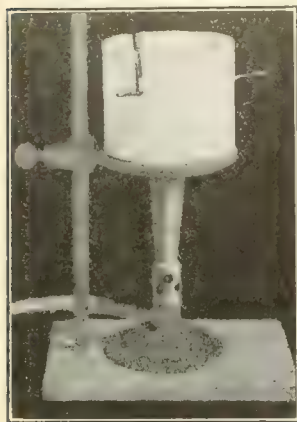
CAOUTCHOUC-LIKE MATERIAL. A caoutchouc-like body resulting from the reaction caused by adding dichloride of sulphur to a mixture containing a ketone capable of yielding isoprene and caoutchouc. [Herman Stern, Munich, Germany, United States patent No. 1,218,713.]

METHOD OF IMPREGNATING FABRICS. Fabrics are treated with a preparation made by mixing rubber, sulphonated castor oil and sulphur. The treated fabric is dried and finally vulcanized. [Lauritz Peterson-Hviid, Copenhagen, Denmark. United States patent No. 1,219,349.]

LABORATORY APPARATUS.**MEASURING STRETCH OF RUBBER. TEST SAMPLES.**

THE ordinary testing machine is provided with a pair of hand-adjustable pointers, movable on a measuring scale for determining stretch. The operator, with or without assistance, endeavors with these pointers to follow the movement of the reference marks on the rubber sample under test. This method leaves much to be desired as to convenience and accuracy. The following substitute has been found entirely satisfactory. The instrument required consists of a pair of hard wood dividers, made by fastening together, with a quarter-inch screw bolt and thumb nut, two strips of wood $\frac{3}{8}$ inch thick, 1 inch wide and 18 inches long. The bolt should be located about 4 inches from one end. The opposite arms are tapered together to a chisel edge. To use the instrument the operator holds it by one short arm, with the right hand, placing the thin edge of the corresponding long arms on the upper reference mark of sample. Without further attention the instrument moves downward with the upper line as the sample is stretched. The operator follows the progress

of the lower reference mark, opening the dividers with the left hand, keeping contact with the line until the sample breaks. Having to follow but one mark, the operator can do it easily and accurately. The final spread of the dividers, less the original distance apart of the reference marks, gives the actual stretch, which should be recorded in terms of percentage on length of the marked interval.

**ALUNDUM FLAME COLLAR.**

This piece of apparatus is designed to produce uniform conditions of intense heat for igniting in alundum or platinum crucibles. These collars are made to withstand wide variations of temperature. [Norton Co., Worcester, Massachusetts.]

METHODS OF TEST.

THE physical testing of rubber materials as specified by the Board of Estimate and Apportionment, of New York City, reported in the March number of THE INDIA RUBBER WORLD, is continued as follows:

DETERMINATION OF FRICTION OR ADHESION STRENGTH

The determination of friction or adhesion strength between the rubber and the fabric, or between the layers of fabric, shall be made as follows:

APPARATUS. All friction or adhesion strength tests shall be made on the tensile testing machine.

RUBBER HOSE AND CIRCULAR TEST PIECES.

All rubber hose and other wrapped circular test pieces shall be slipped on a mandrel one-eighth inch wider than the test piece and of the same diameter as the inside of the hose.

The mandrel with the test piece in place shall be slipped on the pin attached to the power head.

The free end of the test piece shall be clamped to the lower head of the testing machine without twisting and centered over the mandrel.

The weight clutches shall be raised and the machine started at the uniform rate of one inch per minute.

After separation commences the load shall be constantly watched to see that it does not at any time fall below the specification requirement.

On the Schopper machine this load shall be recorded on the automatic recording device.

The entire friction layer or layers shall be separated.

COTTON RUBBER-LINED FIRE HOSE.

Cotton rubber-lined fire hose test pieces and test pieces of a similar character shall be tested exactly as prescribed in the foregoing under "Rubber Hose and Circular Test Pieces," except that the fabric shall be fastened to the power head with a clamp instead of a mandrel.

PACKING AND OTHER FLAT TEST PIECES.

Packing and other flat test pieces shall be tested exactly as prescribed for rubber hose, except that a clamp instead of a mandrel shall be used, and either the fabric or the rubber shall be fastened to the lever head according to the thickness of the rubber.

If the rubber is not thicker than one-eighth inch the fabric shall be fastened to the lever head.

If the rubber is thicker than one-eighth inch the rubber shall be fastened to the lever head.

When fabric and fabric are to be separated, the heavier shall always be fastened to the lower head.

When heavy materials like belting are to be tested, the test pieces shall consist of not more than two plies of the fabric for any one test.

DRY HEAT TEST.

The test pieces prepared and measured beforehand are placed in a hot-air oven at the specified temperature for the specified time, cooled to room temperature, the tensile strength and elongation tests made, compared with the untreated specimen, and the reduction calculated to the nearest tenth per cent.

GASOLINE TEST.

Tube and cover test pieces for the gasoline test shall be cut, prepared and measured as specified under preparation of tensile strength. Test pieces shall be completely immersed in 57- to 63-degree Baumé gasoline for a period of 48 hours at a temperature between 60 and 80 degrees F. They shall then be removed, allowed to rest and freely evaporate in air at the same temperature for 24 hours. The tensile strength and elongation tests shall then be made, compared with the untreated specimens and the reductions calculated to the nearest tenth per cent.

Friction strength test pieces shall be made on a one-inch specimen cut for the mandrel test. After treatment with gasoline, as outlined above, the friction strength shall be determined, compared with the untreated specimen, and the reduction calculated to the nearest tenth per cent.

STEAM TEST.

The determination of steam resistance of hose shall be made by connecting three-foot lengths to a steam supply pipe and maintaining the pressure required in the specification for the period called for. The tensile strength elongation and friction strength tests shall be made on the specimens cut, prepared and measured after the steam test, compared with the untreated specimens and the reduction calculated to the nearest tenth per cent.

DETERMINATION OF POROSITY IN AIR HOSE.

The length selected for test shall be subjected to 140 pounds air pressure. The cover shall then be cut lengthwise with the hose for at least two feet. The pressure shall be maintained for five minutes. At the end of this period the length, still under pressure, shall be submerged in water. If there is a distinct escape of air which is not due to the air confined in the structure of the walls, the hose shall be considered porous.

DETERMINATION OF BURSTING OR PROOF PRESSURE.

The determination of bursting or proof pressure shall be made in the following manner:

The hose shall be stretched out on a plane surface in a straight line, connected to the water line or pump and filled with

water, leaving the air-cock open to allow the air to escape. The air-cock shall then be closed and a pressure of ten pounds per square inch applied.

The test shall then begin by taking original measurements with the pressure at 10 pounds.

Pressure tests shall be measured with a standardized gage. The increase in pressure shall be made at the rate of 100 pounds per minute and the hose under test shall be held for measurement not more than two minutes.

The unit specification may sometimes modify the foregoing procedure in regard to the pressure at which measurements are to be taken and the period of time to hold pressure while measurements are being made, in which case the procedure as stated in the unit specification shall be followed.

When called for in the specifications hose shall be subjected to bursting pressure when laid out straight, when curved in a circle of 27 inches radius and when kinked short off.

When the hose is bent flat on itself with a sharp kink and securely fastened in that position for the kink test, the distance from the tail piece of the coupling to the kink shall be according to size and kind as follows:

Kinked Size	Distance to Kink.
1½-inch fabric and rubber hose.....	15 inches.
2½- and 3-inch fabric hose.....	18 inches.
2- and 3-inch rubber hose.....	24 inches.

EXPERIMENTS ON THE REMOVAL OF COMBINED SULPHUR FROM REGENERATED RUBBER.

By D. Repony.

CONSIDERING the numerous patents issued for processes of reclaiming rubber scrap, there are a large number of rubber chemists, and many others, who are trying to regenerate vulcanized rubber with the object of removing the combined sulphur.

It is not my intention to criticise the value or worthlessness of the average patented process, yet it is not unjust to maintain that the above problem is yet unsolved.

Moreover, it is not my object to describe how this can be accomplished. My intention is merely to give to the readers of THE INDIA RUBBER WORLD my experimenting experience on this problem, with the hope that it may be of value.

Regarding the solubility of vulcanized rubber, when it is passed in solution by boiling with kerosene, etherical camphor oil, oils, liquid tars, nitrobenzol, turpentine, salol, etc., the solubility is more affected by the heat employed than by the solvent.

Under the temperature 130 degrees C. the solution is very slowly obtained, and above 190 degrees C. it is readily obtained, while heating above 200 degrees C. partially decomposes the rubber.

Vulcanized rubber in such solution is not affected in its chemical composition, nor with reference to its combined sulphur.

EXPERIMENTS.

1. Common reclaimed rubber intermixed with powdered caustic soda and subjected to steam heat in the autoclave from 140 to 170 degrees C. for a period of 5 to 12 hours.

2. Just as above, but intermixed with lead filings.

3. Intermixed with lead acetate.

4. Intermixed with iron filings.

5. Vulcanized rubber (auto tires) broken down in smaller pieces and brought in solution with linseed oil at a temperature of 180 degrees C., is poured in boiling 30 per cent caustic soda. The linseed oil becomes saponified and the rubber completely reprecipitated.

None of the above treatments has removed any of the combined sulphur nor improved the product in any way. Of course, the two treatments with caustic soda have removed all the free sulphur, but this I do not consider as an advantage. Liquid tar has great affinity to combine with sulphur, evolving it as H₂S.

6. Vulcanized rubber pieces immersed in liquid tar and ex-

posed in an autoclave to a temperature of 150 degrees C., after 8 hours, will assume the form of heavy cement. This product was afterwards treated with a mixture of benzol and alcohol to effect the separation of the rubber. This resultant product, after analysis, proved to contain all the combined sulphur previously present.

7. Repeated above experiment, with the exception that it was boiled on a hot iron plate so that the product was not exposed to any external pressure that would hinder the formation of H₂S gas. No better result was obtained, however.

EXPERIMENTS WITH NASCENT HYDROGEN.

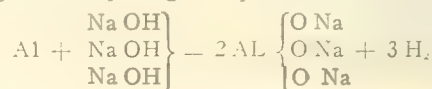
8. Vulcanized rubber was brought in solution with kerosene, mixed with zinc dust, to which was added dilute hydrochloric acid. Upon stirring and boiling this mixture a large amount of hydrogen sulphide was evolved. Repeated this experiment on rubber free of free sulphur and sulphides, but the same reaction took place. After the treatment the kerosene was extracted with alcohol and refined by means of alcohol and finally washed with water. The obtained product analyzed, showed that some combined sulphur was removed, but in its place was substituted chlorine, and the rubber was badly influenced by the acid. Moreover, this product gave a very poor physical test for reclaimed rubber.

9. Repeating above experiment by substituting dilute sulphuric acid in the place of hydrochloric acid, no hydrogen sulphide was evolved, but the rubber was not in any manner changed.

10. Repeating the same experiment with a solution of oxalic acid, the result was the same as with sulphuric acid.

11. Repeating again the same experiment using dilute acetic acid, and in another case highly diluted nitric acid; in both cases the rubber was oxidized to a powdery substance.

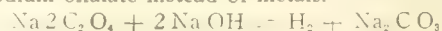
12. Other experiments with nascent hydrogen, the latter being produced by bases replacing H₂ by metals.



Aluminum dust admixed to high grade reclaimed rubber, and rolled out to thin sheets, the latter being immersed in strong, boiling Na OH solution, the reaction takes place vigorously. Of course, in this case the evolution of H₂S cannot be expected. Analysis of this product proves that no part of the combined sulphur has been removed.

13. Repeated the same procedure as above, but instead of aluminum dust, zinc dust was used.

14. Again employed the same reaction with nascent hydrogen by using sodium oxalate instead of metals.



In the two last experiments the reaction was accomplished vigorously, but in no case was the combined sulphur removed, and the obtained product has shown all the same properties that it possessed originally as common reclaimed rubber.

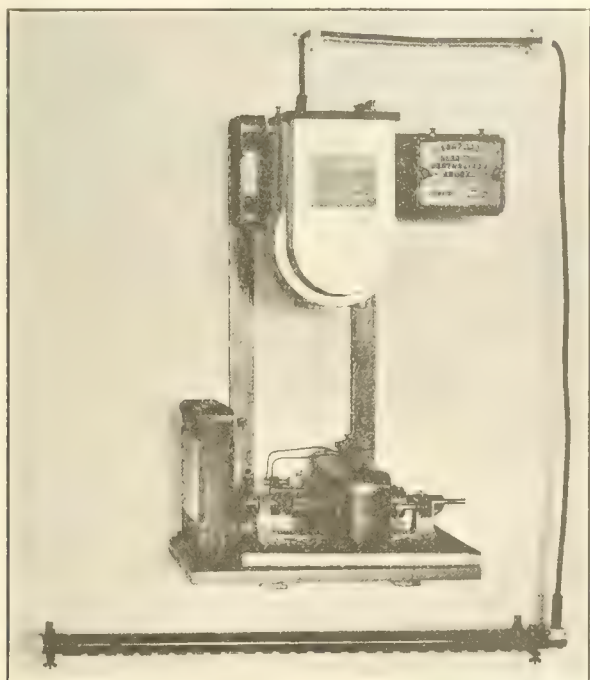
15. One pound of metallic sodium thoroughly mixed with 8 pounds of high grade reclaimed rubber became hot within a half minute after being removed from the mixing rollers. This is partly due to the moisture present in the reclaimed rubber, and partly to the rapid absorption of moisture from the atmosphere. The reaction was so rapid that before I was able to plunge it in boiling water a part of it had ignited. Yet I was able to obtain a large enough sample, which had been subjected to the proper reaction and not burned. Examination proved that by this treatment nothing had been gained; however, nothing had been spoiled.

Among all these experiments doubtless the reaction of nascent hydrogen developed from zinc dust and dilute hydrochloric acid, substituting chlorine for the combined sulphur, is the only interesting one, and may serve as basis for further research work on this difficult problem.

New Machines and Appliances.

THE CHAPMAN NEUTRALIZER.

IT is claimed that the elimination of fire risk in rubber mills due to static sparks, imminent in the operation of spreaders, cement churns and other machines where naphtha is used, may be accomplished by the apparatus shown in the accompanying illustration. It comprises an electric transformer located on some convenient wall and connected by heavily insulated wires to the inductor bars that are attached to the machines to be protected. Briefly stated, the principle is as follows: A direct static charge spontaneously selects from a neighboring



alternating charge the exact quantity and kind to neutralize it. The charge in the material may be positive, or it may be negative, it makes no difference, for the alternating charge has both kinds to select from. The choice is unwavering as Nature's law, and the result is perfect neutralization.

The alternating charge is distributed to the charged material by means of a bar called the inductor placed near the material. The air around the inductor for a distance of a few inches becomes filled with positive and negative charges which are entirely imperceptible to the senses, but which are extremely forceful in killing any other charges that come within the field of their influence.

In the application of this device to a spreading machine, two inductors, extending across the machine and over the fabric, are usually recommended. One is placed just back of the spreading knife and the other is located near the point where the proofed fabric is wound up.

These inductors are placed so that the fabric passes them at a distance of from two to four inches. The influence of the inductors extends through the air for several inches around them, and every portion of the fabric as fast as it comes within this region of influence is imperceptibly but instantly deprived of any electric charge. The result of this action is that the inductor at the head end of the spreader instantly and completely neutralizes every part of the fabric as fast as it leaves the spreading knife, before any charge imparted to the fabric can accumulate sufficiently to discharge to the roll, knife, frame

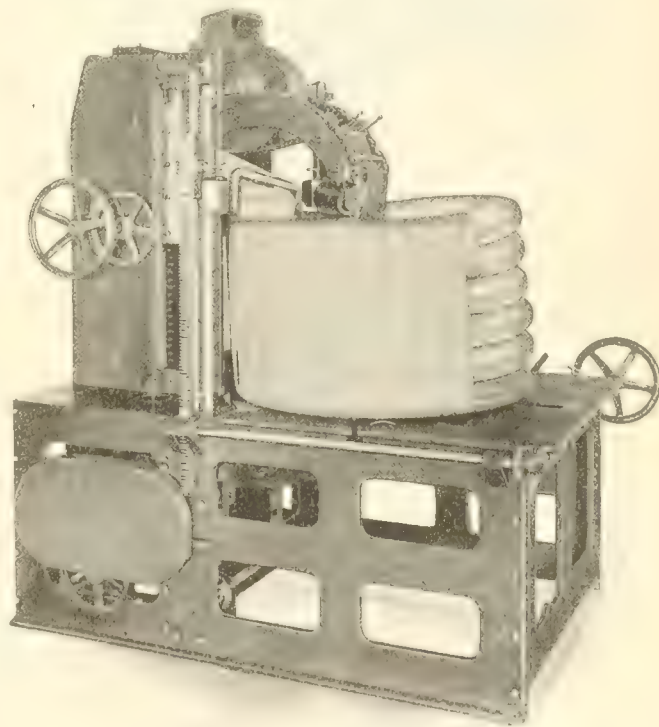
or pipes in the form of a spark. The object of the other inductor, treating the fabric just before it is rolled up, is to remove any slight charge redeveloped by the other rolls over which the fabric passes before winding up.

When successive coatings are being applied, it is often necessary to place an inductor near the unwinding roll and on the under side of the web as it is unrolling. This inductor is mounted on a hinged frame having a roller resting on the roll of cloth, thus keeping the inductor always in the most effective position whether the roll of cloth is large or small. After the cloth has received two or three coatings it is quite likely to generate considerable electricity at the point of separation of the web from the unwinding roll, the web assuming a negative charge and the roll a positive charge, and an inductor so placed will instantly and completely neutralize both charges at the same time. Recent installations have proved that this is the most effective position for an inductor on a spreading machine. [The Chapman Electric Neutralizer Co., Portland, Maine.]

THE T. & W. TIRE WRAPPING MACHINE.

A tire packaging machine that is guaranteed by the makers to wrap at least 50 bundles per hour and make a tight, compact, evenly wrapped bundle, is here shown. It will wrap bundles 36 inches high, if desired, with paper or burlap, the tires being all of the same size or of different sizes as the case may be.

The machine is operated as follows: A roll 20 inches in diameter and 6 inches wide is placed between two endless chains,



of the noiseless type, and is carried down through the inside of the bale and upward around the outside of the bale, thus wrapping the strip of burlap or paper around the bale as it is rotated by the revolving cones upon which it rests. Two other revolving cones over the bale are so arranged that by turning

a hand wheel they are made to bear down on the bale to any degree of pressure required, insuring an even rotation and tight wrapping. The overlapping is evenly done, the width of the overlap can be easily regulated, and changing from the wrapped bale to the next one to be wrapped is instantaneous.

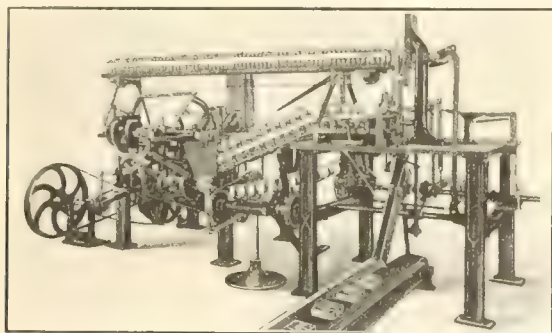
The machine occupies a space 6 feet by 6 feet, by 7 feet high, and requires $2\frac{1}{2}$ horse power to drive it. Motor drive is furnished if desired. [Terkelsen & Wennberg, Boston, Massachusetts.]

THE NEW CARTON ERECTING AND FILLING MACHINE

An extremely light-running, accurate, and rapid machine for cartoning goods in what are called tucked cartons such as are used for boxing rubber heels, fruit jar rings, etc., is the subject of the following illustrated description.

The equipment consists of two units, a carton erecting machine, and a carton filling machine, coupled together and synchronized; all being operated by a $\frac{1}{4}$ horse-power motor. It will handle articles in multiples as well as units. For instance, it can be built to count fruit jar rings into dozens, or will put two heels and a package of nails into each box.

The cartons are placed in a stack, flat or collapsed as they come from the maker, and the articles to be packed are placed on a carrier belt. The machinery erects the carton, closes the bottom, inserts the contents, closes the top, counts the carton, and sends it off on another carrier belt, a complete, symmetrical



package. The speed of this machine depends somewhat on the article packed, but usually runs about 40 packages per minute.

The entire equipment with electric motor and counting device, complete and ready for use, is made to order in accordance with the special requirements of each case. [Arthur J. Wills, North Brookfield, Massachusetts.]

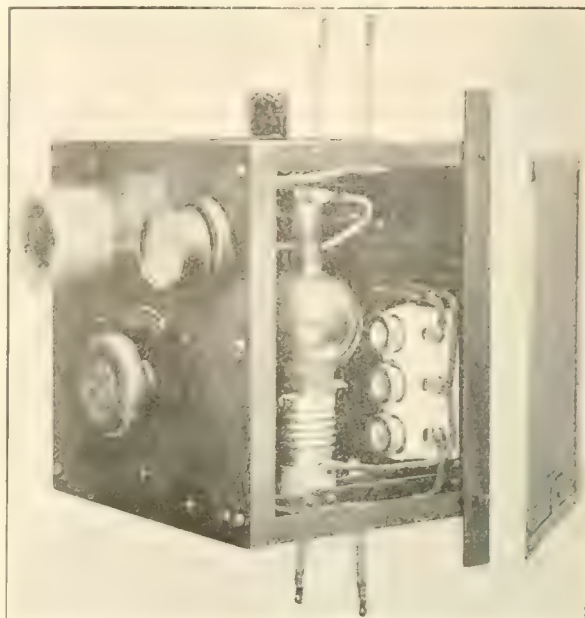
TUNGAR RECTIFIER FOR GARAGES AND SERVICE STATIONS.

To meet the demand for a device that will transform the 115-volt, 60-cycle alternating current supplied to many garages and service stations into direct current suitable for recharging automobile storage batteries, the General Electric Co., of Schenectady, New York, has developed a type of "Tungar" Rectifier of 6 amperes, 75-volts capacity that will charge from one to three storage batteries at a time.

A compensator with 15 taps is attached and a dial switch for adjusting the voltage according to the number of batteries to be charged. The current is instantly adjustable in steps up to six amperes.

After the two upper wires are connected to the alternating current supply and the direct current leads coming out of the bottom of the rectifier are connected to the batteries, which should be connected in series, turning the alternating current switch will start the rectifier charging and without shaking. If the alternating current should fail, the batteries cannot discharge through the rectifier and will start recharging when the current comes on again. Charging costs about 9 cents per 3-cell battery for about a 13-hour charge when groups of ten are charged and about 12 cents per 3-cell battery when charged in groups of

five. The efficiency of the rectifier increases and recharging costs per battery are lowered as the number of batteries on charge is



increased toward the 30-cell, maximum capacity of this type "Tungar."

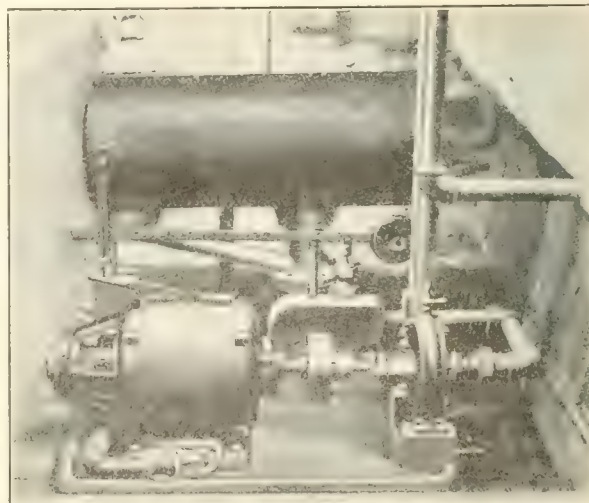
The entire apparatus, including all live parts, is enclosed in a perforated, japanned finish, sheet iron casing. [The General Electric Co., Schenectady, New York.]

A NEW ELECTRICAL PUMP UNIT.

A novel combination of condensation trap, electric motor and centrifugal pump is shown in the following illustration. The application of this unit to a line of heaters for automatically discharging the water of condensation into a hot-well, low-pressure boiler or feed-water heater, appears to be quite practical where the radiation is below the water line.

The unit is placed below the radiator and the condensation flows into the trap by gravity, the air being taken care of by the air vent and an automatic air valve.

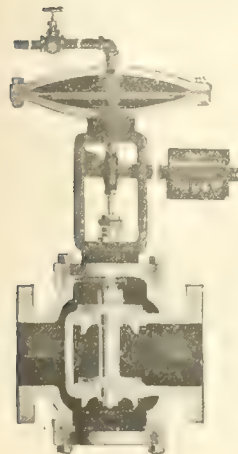
As the trap fills it tilts downward and remains in this position as long as there is any water in the system. In tilting



downward, it throws in a snap switch, starting the motor that is directly connected to the centrifugal pump, and the accumulated water is discharged into the hot-well boiler or feed-water heater.

When the trap is empty it returns to its normal position, at the same time operating the switch that stops the motor and pump. When the trap again fills, the operation of discharging as previously described is automatically repeated. [The American Blower Co., Detroit, Michigan.]

THE FISHER REDUCING VALVE OR PRESSURE REGULATOR.



Steam pressure regulators are of such importance in the modern rubber mill that the following description of a standard type of reducing valve will be of interest:

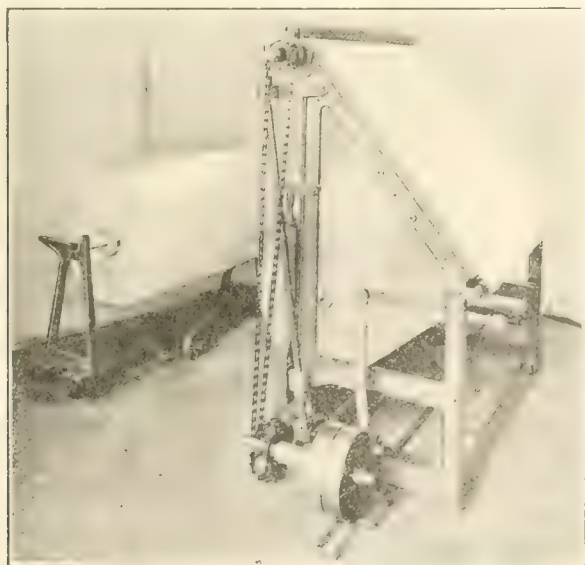
The diaphragm-actuated type of valve, controlled by lever and weight, has for years been accepted by engineers due to its simplicity and positive action. The illustration is that of a valve particularly adapted to low-pressure service, but the type of construction permits the use of different sizes of diaphragms, making it suitable for various pressures.

The valve bodies are iron, except smaller sizes, which are bronze, and the inner valve is a semi-balanced, double-seated type with beveled seats and seat rings ground in and tested under practically the same pressure and temperature that the valve would be subjected to while in operation. This valve will operate with a comparatively small weight and does not require a dash pot as would be the case with a single-seated valve. All valves and seat rings are cast from hard phosphor bronze and the stems are all made from Tobin bronze rods.

In operation the inner valve is normally held by lever and weight. The volume of pressure passing through the valve builds up within the low pressure main and enters the diaphragm chamber through the controlling pipe line. When the low pressure reaches the desired point, a balance is formed with lever and weight, and thus the valve opening is regulated according to the steam consumption and the determined amount of low pressure maintained. [The Fisher Governor Co., Marshalltown, Iowa.]

FABRIC INSPECTION MACHINE.

All fabrics used in the manufacture of rubber goods are carefully inspected. It is, in fact, the first step in their preparation



for calendering or spreading. Every inch of fabric is closely scanned to detect defects in the weave and imperfections in the

finish of the goods. The fabric inspection machine here illustrated is one of the newest types, and therefore of interest.

The roll of fabric comes to the machine on a truck and the end is threaded from the back of the machine between the weight roller and top draft roller above the desk, down to the winding roller in the wind-up attachment. The operator sits in front with foot on the treadle which automatically assumes a neutral position by means of springs. The pressure of the foot forward starts the cloth down the table, and removal of pressure stops the cloth, while pressure on the heel of the treadle reverses the cloth, feeding it up the table.

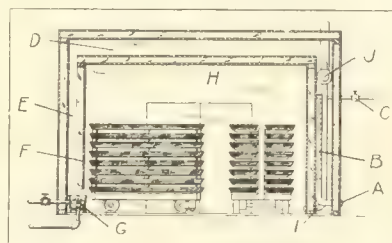
The horizontal lever shown at the left of the table shifts the belt on the tight and loose pulleys. The power drive shown on the left side of the machine may be mounted on the right hand side so that the machine can be put on either the right or left side of the room and the drive come next to the wall.

The rolling attachment back of the table holds the winding rollers in position with latched levers that can be readily thrown back and the roll of fabric quickly removed. [Parks & Woolson Machine Co., Springfield, Vermont.]

MACHINERY PATENTS.

THE HUNTER DRY KILN.

ACCORDING to this process, the rubber is exposed in humid air that is kept in circulation and provided with a continuous supply of fresh air. The temperature in the dry room is raised as



high as 160 to 170 degrees F. and the rubber dried in 12 to 14 hours. It is claimed that rubber treated by this process, whether it has been previously dried or not, is of a better quality than dried in the usual way.

A cross-section of the dryer is here shown. The air enters at A and rises, passing over the steam coils B supplied from pipe C. The heated air then passes through the upper chamber D and downward into the compartment E where the air is deflected downward by the partition F and passes over the humidifier G, into the rubber treating chamber H. From here the air passes out of the dryer through pipe I and header J to the atmosphere, thus creating a constant circulation.

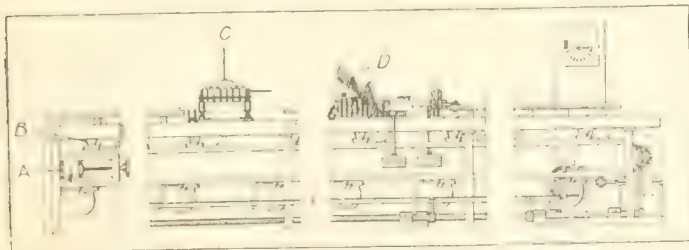
As the air passes over the surface of the water in the humidifier a certain amount of evaporation takes place, depending on the temperature of the water and the humidity of the air. The quantity and temperature of the water supply is automatically controlled so that the air entering the treating chamber is of uniform humidity. The best results are produced most quickly with an air temperature of 140 to 160 degrees F. and a relative humidity of 30 to 35 per cent.

The long trays containing the rubber to be dried are placed on special trucks and are rolled into the dry room, and it is claimed the relatively moist air and the relatively high temperature produces dried rubber of superior quality in a comparatively short time. [Harry Hunter, assignor to The Hunter Dry Kiln Co.—both of Indianapolis, Indiana. United States patent No. 1,218,261.]

FOOTWEAR ROLLING MACHINE.

The object of this invention is a machine for making rubber-soled footwear irrespective of the construction of the uppers. The illustration is a broken side elevation of the machine and A is an endless motor drawn chain conveyor to which are attached the last holders B. The lining, the inner sole, and a toe-strip are applied to the last, the latter overlapping the lining and inner sole. A rag sole is then applied lengthwise of the bottom of the last, overlap-

ping the inturned edge of the toe-strip. The last is then placed on the conveyor and the rag sole, the inner sole and the inturned edge of the toe-strip are rolled down together by the mechanism *C*. The last is then removed from the conveyor and the counter, heel-piece, vamp, quarter and outer filler or sole piece are applied, the last replaced on the conveyor and the parts rolled down by a mechanism not shown. The toe and heel foxing are then applied

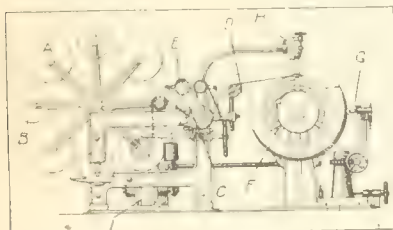


and rolled by a mechanism similar to *C*, when the outer sole is applied and the edges rolled into close contact with the foxings, by a mechanism not shown, the final set or rollers *D* completing the operation. [Myron H. Clark, Malden, Massachusetts, assignor to The Goodyear's Metallic Rubber Shoe Co., Naugatuck, Connecticut. United States patent No. 1,218,983.]

KREMER'S TIRE BUILDING MACHINE.

The principal object of this invention is to provide a tire shoe making machine that will shape or stretch the longitudinal, median portions of the fabric without stretching the edges in a corresponding manner.

The following briefly describes the operation of the machine shown herewith in side elevation.



The rolls of frictioned fabric are placed upon the four fabric holders, *A*, and the strips drawn off by feeding them over the liner reels *B* in such manner that the liners are rolled up on the reels.

From the fabric holders, the frictioned fabric passes to a tension mechanism *C*, which serves to place it under suitable tension or stretching action. The rubberized fabric then passes over shaping rollers *D* that stretch the longitudinal median portions of the fabric, without correspondingly stretching the edges.

The shaping or stretching rollers are yieldingly mounted in any suitable manner, and a registering dial *E* indicates or registers the tension under which the fabric is placed by the stretching devices.

The fabric then passes to the rotary core *F*, upon which the carcass is built up. The reference letter *G* indicates the tread forming and spinning mechanism by means of which the tread is formed and the sheets of fabric are stretched into position, and *H* indicates the bead setting mechanism.

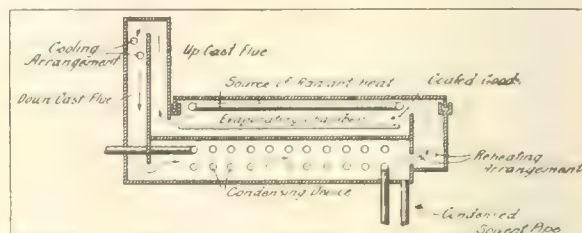
The machine is provided with a change-speed mechanism, and is driven by an electric motor shown at *I*. [Franklin W. Kremer, Carlstadt, New Jersey. United States patent No. 1,216,329.]

THE BAKER SOLVENT RECOVERY APPARATUS.

The illustration is a vertical transverse section of this invention applicable to the recovery of solvents from rubber-coated fabrics.

In operation the coated fabric is constantly moved through the apparatus; the air contained therein is first heated by the reheating coils, thereby decreasing its density, and increasing its evaporating capacity. The heated air is then conducted over the coated surface which is subjected to the heat radiated from the heating coils. The heat lost by the coated fabric and the air in contact with it, due to the latent heat, is made good by radiation

from the coil in the upper part of the evaporating chamber. Thus a smaller volume of circulated air effects the same amount of evaporation and a higher concentration of evaporated solvent is reached, as well as more uniform and rapid drying, without risk of overheating. The current of air carrying a large percentage of evaporated solvent, is now cooled to the saturation point by contact with the cooling coils. The mixed air and solvent vapors thereupon acquire their greatest density, and fall



downwardly through the vertical passageway until the condenser is reached. The available part of the solvent is then condensed and removed through the discharge pipe. A portion of the solvent having been separated from the current of air, the latter is again conducted upwardly into contact with the heating coils, thereby decreasing the specific gravity and causing it to again circulate in contact with the coating to be dried. [Theodore Baker, assignor to E. I. du Pont de Nemours—both of Wilmington, Delaware. United States patent No. 1,218,616.]

OTHER MACHINERY PATENTS.

THE UNITED STATES.

- 1,216,315. Trimming device for rubber cloth and the like. O. E. Heckman, Akron, Ohio.
- 1,216,497. Machine for trimming the canvas of reinforced insoles. T. Rungenbach, Roselle, N. J.
- 1,216,539. Machine for cementing boots and shoes. W. D. Baker, Abington, assignor to Reece Machinery Co., Boston—both in Massachusetts.
- 1,217,879. Making cord tire fabric. E. A. Pye, Newark, N. J., assignor to Musselman Cord Fabric Co., Chicago, Ill.
- 1,218,100. Steam-repair vulcanizer. J. Mathey, Omaha, Nebr.
- 1,218,101. Steam repair vulcanizer. J. Mathey, Omaha, Nebr.
- 1,218,155. Machine for painting tire casings. J. F. Zimmerman, Akron, Ohio.
- 1,218,245. Vulcanizing repair tool. E. R. Draver, Richmond, Ind.
- 1,218,441. Repair vulcanizer. J. Michel, Philadelphia, Pa.
- 1,218,641. Mold for rubber articles. H. E. Fry, New York City.
- 1,218,763. Tensioning device for the making machines. F. H. Groove, Columbiana, Ohio.
- 1,218,881. Tire rim setter. V. C. McLain, assignor to E. J. Bronson—both of East Moline, Ill.
- 1,219,026. Stretching-machine. H. L. Morris, assignor to The Savage Tire Co.—both of San Diego, Calif.
- 1,219,351. Apparatus for making hollow rubber articles. F. T. Roberts, Cleveland, Ohio.
- 1,219,414. Vulcanizing-tongs. F. O. Lake, Washington, D. C.

THE UNITED KINGDOM.

- 14,582 (1915). Apparatus for gaging the thickness of sheet india rubber, etc., as the sheets issue from the calendaring machine. C. J. Beaver, Rangemoor, Crescent Road, Hale and E. A. Claremont, Broom Cottage, High Legh—both in Cheshire.
- 102,495 (1915). A tool for tapping india rubber trees. J. Bosch, Koheripan, near Manondjaja, Java, Dutch East Indies.
- 102,754. Making rubber shock absorbers. A. Turner, and H. J. Turner (trading as L. Turner & Co.), Deacon street, Leicester; F. Sage & Co., 60 Gray's Inn Road, London, and N. A. T. N. Feary, 17 Paston Lane, Peterborough.
- 102,802. Footwear vulcanizer. A. E. Alexander, 306 High Holborn, London. (Goodyear's Metallic Rubber Shoe Co., Naugatuck, Connecticut, U. S. A.)
- 15,133 (1915). Apparatus for use in the manufacture of rubber shoes. W. J. Jackson-Mellersh, 28 Southampton Buildings, London. (Boston Rubber Shoe Co., Malden, Massachusetts, U. S. A.)
- 15,438 (1915). Rubber testing machine. H. H. Grundy, 393A, City Road, and P. Schidrowitz, 57 Chancery Lane—both in London.
- 15,508 (1915). Repair vulcanizer. G. Guattieri, and L. Cavalletti, Via Nazionale, Rome.

THE DOMINION OF CANADA.

- 173,025. Hose vulcanizer. Canadian Consolidated Rubber Co., Limited, Montreal, Quebec, assignee to H. G. Blanchards, New York City, and F. Duesler, Cleveland, Ohio—both in U. S. A.
- 173,079. Tube machine. A. Bleecker, Akron, Ohio, U. S. A.
- 173,333. Tire mold. The United States Rubber Co., New York City, assignee of C. F. Adamson, East Palestine, Ohio, U. S. A.

173,343. Tire building machine. Canadian Consolidated Rubber Co., Limited, Montreal, Quebec, assignee of G. F. Fisher, Roselle, New Jersey, U. S. A.

173,425. Wrapping machine for hose. Canadian Consolidated Rubber Co., Limited, Montreal, Quebec, assignee of H. Z. Cobb, Winchester, Massachusetts, U. S. A.

THE FRENCH REPUBLIC.

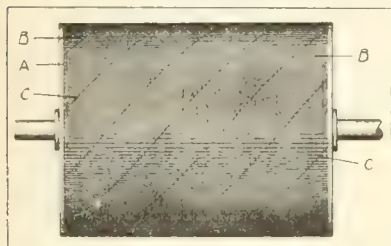
481,607 (April 27, 1916). Improvements in a machine for the manufacture of tires. The Hartford Rubber Works Co.

481,795 (May 16, 1916). Mold for the manufacture of rubber heels. J. G. Eufford.

PROCESS PATENTS.

MAKING CORD TIRE FABRIC.

BY this method cord fabric may be made in lengths greater than can be obtained by cutting standard cord fabrics on the bias. Referring to the drawing, *A* is a cylindrical drum on



which a single layer of cord *B*, *B* is wound in close contact. The drum can be of any reasonable diameter so that fabric of great length may be produced. When a layer of cord has been wound on the drum, a coating of rubber solu-

tion is applied that serves to hold the threads together. The drum is then revolved at high speed and the layer of fabric cut into spiral bands of the required width, as shown at *C*, *C*.

After cutting, the completed bands, in which the strands lie at an angle of 45 degrees, are removed from the drum and employed in building cord tire casings in the usual way. While only one layer is shown, it is obvious that two or more layers may be applied to the drum, rubber solutioned and cut in the above described manner. [Ernest A. Pye, Newark, New Jersey, assignor to Musselman Cord Fabric Co., Chicago, Illinois. United States patent No. 1,217,879.]

SEMI-METALLIC PACKING. Fifty to 75 parts, by weight, of fiber, 10 to 30 parts of rubber or other gum, 10 to 30 parts of shredded metal, and 5 to 15 parts of filler are thoroughly mixed together at the required temperature, and the mass rolled into sheets. Thick sheets are built up from a plurality of thin sheets secured together by rubber cement, the sheets being laid, with the shreds of metal lying in different directions. [Louis J. Ryan, assignor to the Royal Equipment Co.—both of Bridgeport, Connecticut. United States patent No. 1,215,064.]

CUSHION TIRE. The body and tread are formed of granulated rawhide impregnated with rubber and the inner tube is made of mercerized rubber-treated fabric of special weave. [Albert H. Henderson, assignor to the Henderson Rubber Co.—both of Baltimore, Maryland. United States patent No. 1,215,275.]

OTHER PROCESS PATENTS.

THE UNITED STATES.

1,217,654. Method of vulcanizing rubber. W. B. Burce, assignor to The Burke Process Co., both in Cleveland, Ohio.

1,218,350. Method of impregnating woven belts and conveying-bands with balata. H. W. Anderson, Odense, Denmark.

1,218,949. Process of treating rubber. E. E. A. G. Meyer, assignor to Morgan & Wright, both of Detroit, Mich.

THE DOMINION OF CANADA

173,169. Process of making hard rubber articles. Canadian Consolidated Rubber Co., Limited, Montreal, Quebec, assignee of H. Weida, Highland Park, New Jersey, U. S. A.

173,026. Process of making hollow rubber articles. Canadian Consolidated Rubber Co., Limited, Montreal, Quebec, assignee of N. D. Crawford, Elizabeth, New Jersey, U. S. A.

173,344. The process of manufacturing hose. Canadian Consolidated Rubber Co., Limited, Montreal, Quebec, assignee of A. E. Hopkins, Cleveland, Ohio, U. S. A.

THE FRENCH REPUBLIC.

481,851 (August 23, 1915). Process for the recovery of casings especially non-skid tires. L. B. Becker.

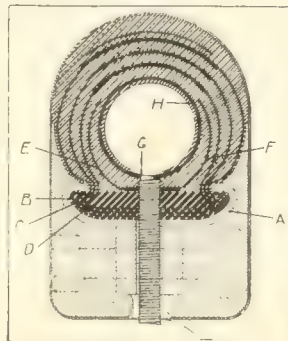
481,544 (April 19, 1916). Process for impregnating fabric with gutta percha, balata, or other similar substances. Aktieselskabet Roulunds Fabriker.

MISCELLANEOUS PATENTS.

THE THROPP PNEUMATIC CUSHION TIRE.

IT is claimed that the qualities of the pneumatic tire are combined with the well-known advantages of the cushion tire in this invention. Moreover, the tire is permanently attached to

the rim with a hard rubber compound, and is vulcanized by the open cure, wrapped tread process.



Referring to the illustration, a transverse section of the tire in its mold, *A*, is the rim on which is first placed a layer of a hard rubber compound, and a strip of frictioned fabric *B* being circumferentially laid thereon. Another layer of rim compound is then applied and a second fabric strip *C* superposed, followed by still another layer of rim compound,

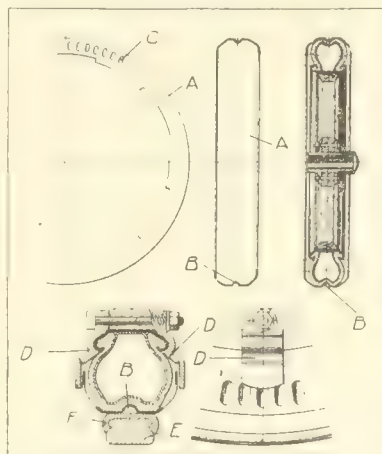
over which is placed a third fabric strip *D*. The rim is then filled to the level of its edges with rim compound, on which is laid a layer of softer compound followed by fabric strips *E* and *F*.

The air valve *G* of the inner tube *H* is then forced through the opening in the rim and inflated sufficiently to hold its circular form. After a layer of soft compound is laid around the inflated tube, the fabric strips *E* and *F* are formed around it, and a second layer of similar compound superposed and covered by the outer edges of the fabric strip *D*. Then a third layer of compound is applied and covered by the fabric strip *C*, followed by a fourth layer covered by fabric strip *B*.

More compound is then laid on, including a breaker strip and tread portion when the tire is placed in the mold, wrapped and vulcanized. [Peter D. Thropp, assignor to the De Laski & Thropp Circular Woven Tire Co.—Trenton, New Jersey. United States patent No. 1,217,665.]

A FRENCH PUNCTURE-PROOF TIRE.

The object of this invention is to eliminate the usual tread and breaker strip in the construction of pneumatic tires. The casing is built up in the usual way, but without the tread, however, and is afterwards cured in the ordinary manner.



The tread band *A*, shown in the upper illustration, is an annular sheath of sheet metal that is slipped over the tire before inflation, being centered and held in place after the tire is inflated by the annular, median groove *B*. The metal band completely covers the tread and the sides extend down far enough to protect the

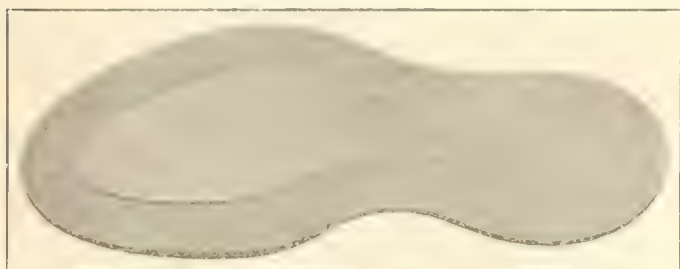
tire against puncture. The sides are also far enough away to allow the expansion and contraction of the tire while in use. Both sides of the band are perforated around their entire circumference; a few of these perforations are shown at *C*, which are intended to prevent the accumulation of mud and dirt.

To prevent the band from slipping off the tire in case it should become deflated, six pairs of metal clips *D*, shown in the lower drawing, are removably attached to the rim by transverse bolts. A modification consists of a solid rubber tread *E*, vulcanized to a metal rim *F* welded or riveted to the band *B*. [R. de Prandieres. French patent No. 481,350.]

New Goods and Specialties.

FIBER SOLE WITH MOLDED LIFT

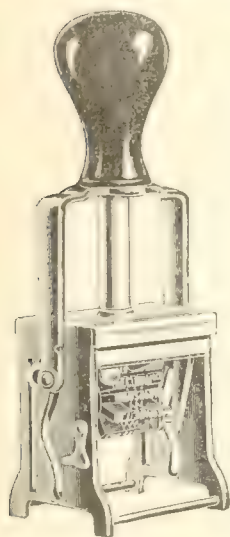
In the recent years of the leather market, the demand for fiber-sole shoes, in which rubber is used, can scarcely be overestimated. Improvements in composition and adaptation for the intended purpose are constantly being made, and the fiber sole shown herewith contains an entirely new feature for which special merit is claimed. This improvement is in the form of a lift of the same material, molded on the sole and obviating the necessity for the usual cork filler in the space between the outsole and the insole of the shoe. The solid fiber supports the insole, maintains the welt in position, and increases the wearing capacity. The raised part, when on the shoe, gives the edges a pulling power in the opposite direction, offsetting the pull of the welt and preventing it from returning to its original position when stitched to the upper and thereby causing the edges of the sole to turn up—



a common fault in fiber-sole shoes. The construction of the sole also prevents air pockets under the outsole which are very disagreeable when stepping on a small stone.

It is possible, with this sole, to add one-half of the thickness at the point of wear and yet maintain as thin an edge as required for good appearance on women's shoes. [Donnelly Machine Co., Brockton, Massachusetts.]

KOSSUTH DATER WITH SOLID RUBBER BAND



The usual device for date stamping has a number of rubber bands covering a metal revolving apparatus, but in the self-inking dater, here illustrated, rubber projections with the imprint of the necessary dating type are molded in a solid rubber band. The action of a new style date slot prevents corrosion from contact with the rubber date band, insuring the free entry of dates at all times. The movement is roller bearing and is claimed to eliminate practically all friction to the wearing parts. The frame is of heavy steel throughout, with no extra swinging plates or attachments. A supplemental die plate takes the printing die and holds the type in perfect alinement. The Kossuth dater is made in two sizes. In the one shown the die plate measures $2\frac{1}{8}$ by $1\frac{1}{2}$ inches. [R. A. Stewart & Co., New York City.]

PUBLIC NOTICE ON A RUBBER MAT

A neat combination of utility and comfort is seen in front of a hotel doorway on Broadway, New York City. A large rubber mat, perhaps 20 feet long and covering half the width of the sidewalk is of the usual perforated pattern, but has in letters a foot long the words "Keep This Space Clear," a standing notice to chauffeurs and coachmen not to occupy the street in

front of the doorway except when taking on or delivering passengers.

"TYRIAN" FIRST AID TOURNIQUET.

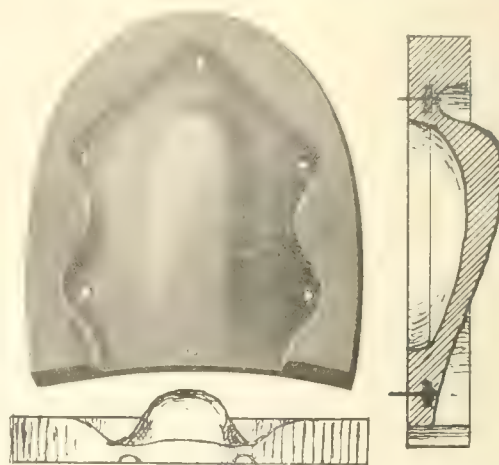
A tourniquet that can be quickly applied and that holds fast at the desired tension is a valuable adjunct to first-aid equipment, and the "Tyrian" tourniquet, here shown, is specially de-



signed to meet these requirements. It is made entirely of rubber, 3 feet long, $\frac{7}{8}$ inch wide and $\frac{1}{8}$ inch thick, with a nickel-plated clasp and spring attachment which affords a firm fastening, easily secured. To apply this tourniquet the lever at the spring is depressed, the loose end of rubber inserted, the pressure relaxed in the spring and the rubber drawn to the desired tension. [Tyer Rubber Co., Andover, Massachusetts.]

PNEUMATIC CUSHION HEEL.

In the rubber heel here shown, a mechanical cushioning device which operates automatically supplements the beneficial effect of the usual rubber heel. When a heel built on this principle is attached to a shoe, the central portion, indicated in the illustration, strikes the ground first at every step taken. Owing to the construction of this central tread portion, with its recess and cooperating pneumatic chamber, it will be forced inward,

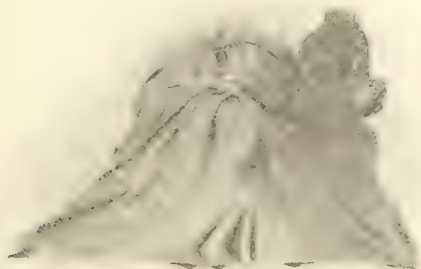


compressing the air therein and absorbing the first shock, thus bearing the heaviest part of the impact while the wearer is walking or standing. After being forced inward, the centrally projecting tread portion will be flush with the peripheral tread portion, the latter acting in turn as a cushion, in the same manner as any ordinary solid cushion rubber heel. A cupping or suction is thus produced between the peripheral tread portion and the street pavement or ground surface, insuring a firm grip and anti-skid quality, which is claimed to maintain its efficiency during the entire life of the heel.

This principle may be carried out for the sole of a shoe and is particularly applicable to the requirements of athletic footwear. The special advantages claimed for this heel are reduced weight and consequent saving in cost of manufacture; greater resiliency, and sure grip. [Oscar Mussinan, New York City.]

ALL-WEATHER SLEEPING BAG.

The sleeping bag shown in the accompanying illustration is designed for maximum comfort and protection while sleeping outdoors. The light weight, rubberized material used is suitable for all kinds of weather, a woolen blanket wrapped around

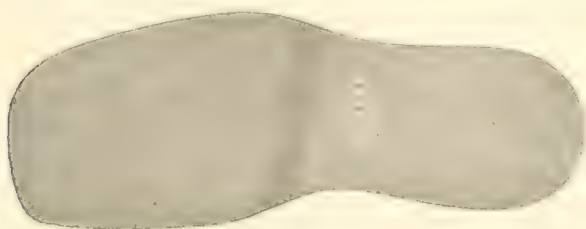


the body affording extra warmth if needed. A hood protects the head, and a netting is attached by special fasteners to keep out the mosquitoes. Plenty of room is afforded, the dimensions being 7 feet 6 inches in length and 4 feet 3 inches wide. The bag is fitted with an inside pad and bolster, pockets for valuables, and a rattan bow which is adjusted when in use, to hold the hood in place. [C. W. Sirch, Los Angeles, California.]

LACED MILITARY RUBBER BOOT AND "TENAX" SOLE.

An exceptionally neat appearing rubber boot favored by army officers is shown in the accompanying illustration. It is made on the straight lines of the army leather boot, drawing on with more difficulty than the old-style, loose-top rubber boot, but appearing to much better advantage when on the foot. The novelty in this model is contained in the 6-inch lacing up the side, this innovation meeting the demand of those requiring slightly fuller dimensions around the leg. This boot is made in tan color, thus more closely resembling the regulation leather military boots and more in keeping with the uniforms now in vogue at the front.

To meet the insistent demand for satisfactory substitutes for sole leather, a new composition material called, "Tenax" has been evolved by the same manufacturer through painstaking experimentation and thorough testing of results in actual wearing practice. It contains sufficient rubber to impart proper flexibility and to protect the feet against wet pavements and walks, and it is claimed that this material possesses remarkable non-slip qualities, cuts to ad-



vantage and holds stitches well, being similar to leather in strength and toughness, lightness and long wear. It is made in

the various shapes and thicknesses required by the trade and is also supplied in rolls. [Gutta Percha & Rubber, Limited, Toronto, Canada.]

PRODIUM TRUCK TIRES.

A new feature in the tire equipment of 1917 commercial cars is the Prodiu truck tire. This is a new pressed-on type of the channel-base tire with a wide tread that is designed to carry heavy loads. It is made from special compound that produces a soft, flexible and resilient tread of unusual tensile strength and durability. This tire is made in all sizes and in order to facilitate prompt service to customers, all branches of the company are equipped with tire applying presses. Tests have been made under severe road conditions in which tires of this make are said to have averaged better than 12,000 to 14,000 miles. [The Republic Rubber Co., Youngstown, Ohio.]

**ALL-RUBBER "HYDRO" SUIT.**

The adaptation of rubber and rubberized materials in clothing for various purposes is constantly increasing, with added improvements and devices for the comfort and protection of the wearer. The all-rubber one-piece costume shown herewith is now in use on many of the United States submarines. It is made of the best rubber sheeting, all seams being steam vulcanized. The belt at the waist and removable straps at the trouser knees prevent the suit from drooping when in use and afford adequate knee room. The elastic wrists fit tightly and the neck has tie-straps for close fitting.



The rubber cap worn with this "Hydro" suit has snap fastenings and an adjustable cape which reefs close with extra studs. The wearer is thus completely covered with rubber from head to foot. [Abercrombie & Fitch Co., New York City.]

RUBBER PORK BAIT.

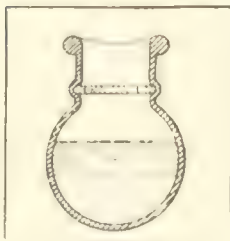
The use of strips of pork rind as a bait in fishing has long been recognized by those "in the know" as a first-class fish-catcher. It is white in color, flexible, and possessed of a tantalizing wiggle.

Pork bait is now successfully imitated and also improved upon by using specially prepared, pure, white rubber with white, red or black heads, in the form shown in the accompanying illustration. This rubber bait is, of course, extremely flexible, responding to the slightest movement, and it is claimed to imitate perfectly the action of a live minnow. An evident advantage over the actual pork rind is its lasting quality, one rubber pork bait being used many times. It is made in two sizes: 3½ inches long for bait casting, and 2 inches long for fly fishing. [S. Arnold, Kansas City, Missouri.]



RUBBER EYE CUP.

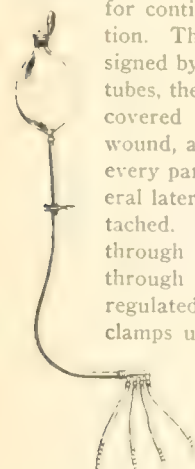
An eye bath made entirely of rubber is formed with a bulb portion by which the liquid is forced upwards against the eye. The neck, which may be stiffened by thickening or corrugating its wall or by means of a rigid collar, is provided with a soft ringed edge. A perforated check-plate may be fitted in the base of the neck. [H. St. C. Moss, Hertford, Middlesex, England. British patent No. 102,870.]



RUBBER TUBING FOR WOUND IRRIGATION.

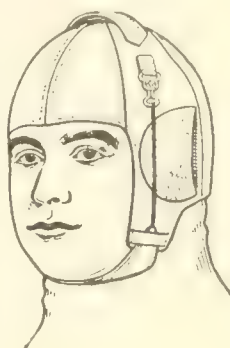
A new and remarkably successful treatment for infected wounds, which was mentioned in the January, 1917, issue of THE INDIA RUBBER WORLD, embodies the use of various rubber tubes for continuous irrigation with a special antiseptic solution. The apparatus for this method of treatment, designed by Dr. Alexis Carrel, consists of sterilized rubber tubes, the ends of which are perforated with many holes, covered with sponge tissue and introduced into the wound, as many of them as may be needed to reach its every part. The tubes lead up to a glass tube with several lateral orifices to each of which a rubber tube is attached. The solution flows from a glass receptacle through a rubber pipe into the glass tube and thence through the rubber tubes to the wound, its flow being regulated either by a drop-counting apparatus or by clamps upon the tubes.

When the wound becomes thoroughly sterile it is sewn up, and a favorite sewing of Dr. Carrel's for large, deep wounds closes like a laced shoe; two broad strips of adhesive plaster, each bearing a row of hooks, are stuck to the skin along the edges of the wound and a pair of rubber laces is twisted back and forth and drawn tight, thus obviating the necessity of sewing through the skin.



AVIATOR'S HOOD.

The aviator's hood here illustrated is made of rubberized material shaped to fit the head closely, yet comfortably, with a single strap fastening that is easily attached. These hoods are exceptionally neat in appearance, and are claimed to be lighter in weight and less mechanical than many others, while preserving all the necessary protective qualities. They are equally suitable for professional automobilists to wear while competing in road races. [Sanders Co., Indianapolis, Indiana.]



"PNEUMASTIC" TIRE FILLER.

A new tire filler, consisting almost entirely of rubber, the slight proportion of other ingredients adding to its toughness and long wearing qualities, is now on the market. The substance thus formed is very light and resilient, and it is claimed that "Pneumatic" possesses extreme flexibility, uniformity of power and greater momentum, with entire absence of heat and friction, giving increased mileage from tires without sacrifice of riding comfort. The claims of the manufacturer are substantiated by a written guarantee for a period of two years, free replacement being made should the filler prove defective in any way during that time. [The Altenburg Tire & Rubber Co., Davenport, Iowa.]

1914-1916 RUBBER PRICE ADVANCES SMALL.

THAT the rubber industry has fared exceptionally well in respect to its most important raw material since the outbreak of the European war is gleaned from a report just issued by the Bureau of Foreign and Domestic Commerce, Miscellaneous Series No. 52. Wholesale prices of leading articles in United States markets at frequent intervals from January, 1914, to December, 1916, New York, Boston and Chicago quotations, are tabulated, and indicate that whereas crude rubber (Upriver fine) had increased only 27.6 per cent at the end of the period, leather, hides, wool, manila, lead and zinc had nearly doubled; iron, steel and sisal hemp had more than doubled; while Bessemer and open-hearth steel had trebled. Cotton had increased 39 per cent in price; jute butts, 36 per cent; raw silk, 26.5 to 42.8 per cent, according to grade; and mohair 48.6 to 71.4 per cent. The only important raw materials mentioned which had undergone less increase than rubber were tin, 12 per cent; jute, 13.8 per cent; crude petroleum, 14 per cent; and silver (London quotations 0.925 fine) 26.7 per cent.

THE MARKS RECLAIMING PATENT.

It may be remembered that in THE INDIA RUBBER WORLD of January 1, 1916, a full report was published of a decision of the United States Circuit Court of Appeals affirming the decision of the District Court in Buffalo, New York, sustaining the validity of the Marks or "Alkali" patent for rubber reclaiming. The latest phase of the case is the decision handed down March 12, 1917, which affirms the decision of the District Court in Ohio, thus holding that the patent is invalid. It will, therefore, be seen that these two decisions, diametrically opposite, have both been affirmed by higher courts and the questions of the validity of the patent and of infringement are still undetermined.

RECOVERY OF RUBBER AND FABRIC FROM TIRES.

In practically all processes for reclaiming rubber from tires the fabric is destroyed. In these days of conservation, however, the recovery of the fabric as well as the rubber is well worth consideration. In the lists of chemical patents printed in the May and November, 1916, issues of THE INDIA RUBBER WORLD, brief mentions were made of a process having the above economy for its object, as worked out by C. de Villers, of Neuilly, France.

In the preparation of rubber cements it has already been proposed to employ tetrachlorethane as a rubber solvent. De Villers uses this substance, heated to a boiling point, for the purpose of dissolving the rubber and also a second time, for freeing the rubber from sulphur.

The tires are placed in a closed receptacle containing tetrachlorethane, enough of the latter being used to completely cover them. The vessel is heated, directly or by means of steam, to the boiling point, and the vapors produced are passed into a condenser. At first the rubber swells and then dissolves into a liquid, and at the end of an hour the fabric is completely freed of rubber. This mass is next sent to the filter press to separate the fabric from the rubber in solution, and since the supply of tire fabric is so much smaller than the actual demands after further cleansing, this fabric can be utilized to advantage.

The rubber is then precipitated from the solution by the addition of water. To free this rubber from sulphur it is subjected to a first treatment with tetrachlorethane, which is prolonged until the rubber begins to swell, indicating that the free sulphur is then dissolved. This tetrachlorethane charged with sulphur is allowed to run off and is replaced by a second quantity of fresh tetrachlorethane which, after having been brought to boiling point, dissolves the desulphurized rubber. It will be seen that this treatment passes through two phases, tetrachlorethane only being employed.

JUDICIAL DECISIONS.

DUNLOP RUBBER CO., LIMITED, v. MICHELIN TYRE CO., LIMITED.
This was a claim by the plaintiffs, who sought to recover damages for alleged libel; also an injunction to restrain from publication of the matter complained of. The defendants denied publication of libel, or that the publications referred to plaintiffs and bore defamatory meaning or were capable of malice. They plead privilege of the occasion and counter-claimed for damages and alleged libel; plaintiffs in reply denied libelling the defendants.

Plaintiffs complained that the Michelin company had attacked their honesty and integrity in their advertisements which appeared in the same newspapers and were designed to have a greater effort upon readers by repetition.

In their counterclaim the defendants stated that the plaintiffs had advertised against them, attacking them as foreigners responsible for the sale of rubbish.

After due deliberation the jury found for the plaintiffs on the claim, with £1,000 damages, and for the defendants on the counterclaim with £750 damages. ["The India-Rubber Journal," London, February 17 and 24, 1917.]

ADAMSON v. GILLILAND. This is a suit brought by the petitioner for the infringement of a patent for a vulcanizing device.

This device consists of two sheets of metal, between which, when heated, the material is to be vulcanized. The upper side of the upper of these sheets is shaped like a cap in which gasoline can be placed to heat it.

Defendant admitted making and selling devices like the plaintiff's, but testified that he made them first. The plaintiff put his invention on the market in November, 1911, and the defendant did not put out his vulcanizer until February or March of the following year; but the defendant declared that on August 7, 1911, 12 days before the plaintiff made the drawing of his invention, he had had castings made that are identical with plaintiff's device. The plaintiff's cup had pins projecting from the bottom arranged in circles around a central one, which he declared served to conduct the heat of the flame downward into the vulcanizing plate and the combustible fluid. Defendant's original castings showed a similar arrangement; he explained that the similarity was accidental; that the pins were of no use and that they were merely there to be used as a talking-point to deceive the public.

It was held that since plaintiff had made public his device, while defendant had not, and there was no other channel of information between the two, plaintiff must be regarded as the originator of the device. In a previous suit by the plaintiff, District Judge Geiger decreed for the plaintiff. The district judge, after hearing and criticizing additional evidence, said that the new testimony would not have changed Judge Geiger's opinion. The circuit court of appeals, regarding the action of the district judge as a yielding to the authority of the former decision, reversed the decree upon the evidence as it stood in print. [United States Supreme Court.]

LEONARD HARTUNG v. TEN BROECK TYRE CO., INC., Louisville, Kentucky. This was an appeal from the Circuit Court, Jefferson County, Common Pleas Branch, Fourth Division, which decided in favor of the defendant in the action for injuries by Leonard Hartung against the Ten Broeck Tyre Co. Hartung declared that a large counter weight on a lever which he operated became detached, the lever flew up and struck him in the breast, injuring him. It was held that there was not sufficient evidence of negligence on the part of the defendant. Judgment was affirmed. [Southwestern Reporter, Vol. 190, page 677.]

EUREKA FIRE HOSE CO. v. FURRY, CITY TREASURER, Van

Buren, Arkansas. This was an appeal from the Circuit Court, Crawford County; James Cochran, judge, which decreed for defendant in the cancellation of warrant's action. After purchasing hose from the appellant and issuing a warrant therefor, the city, Van Buren, called in its warrants.

Counsel for appellant contended that the special act attempting to raise Van Buren from a city of the second to a city of the first class is void, and all proceedings by officers of Van Buren as a city of the first class are void, including the call of the city's warrants for cancellation and reissuance.

It was judged that the officers were *de facto* officers acting under color of an election and at a time when the special act had not been declared unconstitutional, and their proceedings were therefore valid.

Judgment was affirmed. [Southwestern Reporter, Vol. 190, page 1427.]

FREY v. MARVEL AUTO SUPPLY CO. ASPECTS OF PATENTS. United States Circuit Court of Appeals, Sixth Circuit, decided that, even though every element of a patented combination covering a mechanical device be old, there may still be patentable invention if, by the combination, a new and useful result be produced, or an old result in a new and materially better way. [The Federal Reporter, Vol. 236, page 916.]

TRADE-MARK DECISIONS.

Among recent trade-mark decisions of interest to the rubber trade might be mentioned the following:

It has been decided that the name "Horseshoe" as a trade-mark for automobile tires, casings and tubes is not descriptive, even if, as supposed, the tread of the tire bears projections in the shape of a horseshoe. This decision further states that there is no mechanical advantage arising from this feature of the tire and the name is no more descriptive than the figures 4-11-44 would be if the projections were made in the form of these figures. As to the tubes, the mark is certainly not descriptive since the objection does not apply to them.

The trade-mark is allowed of a design showing the picture of a pneumatic tire within which is the head of a chauffeur, and above it the head of a bulldog grasping in its mouth the letters ALWASHOLD, in a peculiar form of lettering. It has been decided that this word is not descriptive as applied to a material for repairing tires. The other features overshadow the word in any event, but this is more than a case of misspelling of a descriptive word as the words themselves can only exist in connection with the bulldog's head.

In this connection it will be interesting to note that, according to the "San Francisco Chronicle," the Secretary of State of California has denied registration of a trade-mark to the Dam Sire Puncture Proof Co. because the mark for which application for registration was made was considered profane and its use, therefore, contrary to public policy. Not only this, but it was pointed out to the applicant company that the words were in any event descriptive of the goods and hence not registrable.

RUBBER INSPECTOR'S POSITION OPEN.

The United States Civil Service Commission announces an open competitive examination for inspector of rubber to fill a vacancy in the Quartermaster's Corps, Philadelphia, Pennsylvania, at \$1,200 to \$1,500 a year, and future vacancies requiring similar qualifications. Examinations may be held at cities near the residence of applicants, certain cities in each State being named. The date of examinations is April 18, and any men who desire to apply should write at once for form 304 to the Civil Service Commission, Washington, District of Columbia, stating that the examination desired is for "Inspector of Rubber (male)."

The Editor's Book Table.

1918. Compiled by C. Drieberg, B.A., F.H.A.S., Colombo, Ceylon.

SECRETARY DRIEBERG has collected in this small volume a real compendium of agricultural and horticultural information of this important tropical island. It seems as if no practical hint which could be helpful to the vegetable or fruit planter is omitted. There are crop notes on cotton, tobacco, kapok, castor bean and dhall; veterinary notes, pests and diseases, and many rules, useful hints, etc., but practically no mention of rubber in any form. The list of officers and members is given; there is a clear, readable map, which shows in colors the annual rainfall. Not the least interesting feature of the book is the advertising department, consisting of a number of pages following the text.

MEDEDEELINGEN VAN DEN RYKSVORLICHTINGSDIENST TEN
NEDERLAND. Second series, 1916. Afdeling Handel, Lange Houtstraat 36, 'sGravenhage. [Paper cover, 544 pages. Many illustrations, diagrams and statistics. Price 2.50 florins.]

This publication of the Department of Commerce of the Netherlands Government contains numerous interesting reports of experiments and investigations in various departments of rubber chemistry and manufacture. A very elaborate introduction, besides expressing general ideas on inquiries pertaining to rubber, classifies the contents of the widely differing articles. This classification has six main divisions: (1) Inquiries in latex and judgment of crude rubber by its appearance; (2) chemical examinations of crude rubber; (3) the viscosity of crude rubber solutions; (4) depolymerization and oxidation of crude rubber; (5) experiments in vulcanization and examination of the vulcanized product as a basis for the inspection of crude rubber; (6) inquiries into the process of vulcanization.

An interesting article under the first heading is that by Professor G. V. Iterson, Jr., in which is explained and described an apparatus for determining the rubber content of latex. A report of the results of a scientific test of empiric judgment of crude rubber lays stress on the advantages and improvements that would arise from a general use of scientific methods in examination.

Attention must also be called to a review of the chief methods employed by the *Voorlichtingsdienst*, a series of mechanotechnical investigations and an essay on the great importance of chemical investigation for the future of plantation rubber. Among the papers concerning rubber inspection is one describing simplified methods for inspecting crude rubber, and another on the desirability of international inspection of crude rubber. The latter cites several methods as employed by foreign investigators and deplors the fact that fixing an international standard of inspection presents so many difficulties, owing to the lack of agreement of authorities on several important scientific points.

A report of the analysis of several products from lactiferous trees of Surinam and a comparison of gutta percha mechanically extracted from leaves and from stems of trees on the government gutta percha plantation of Tjipetir ought to interest many.

Valuable are the great number of clearly described experiments which concern problems, such as the effect of treatment with the washing mill; determination of resin content and its influence upon vulcanization; miscellaneous physical tests of vulcanized rubber; viscosity of rubber solutions; unsaponifiable resins; the influence of solvents on viscosity and porosity; improvement of rubber by heating in carbonic acid atmosphere; maximum of sulphur with which rubber unites; influence of time and temperature and the quantity of sulphur

used upon the properties of vulcanized rubber; observations on cold vulcanizing; the insolubles in rubber; the absorption of moisture by raw rubber in various atmospheres; paraffin as a filler for rubber; resin and impurities in balata and gutta

MANUFACTURING COSTS AND ACCOUNTS. BY A. HAMILTON Church. McGraw-Hill Book Co., Inc., New York City. [8vo, 447 pages, illustrated. Price, \$5.]

The importance of an accurate system of cost accounting is one which is appreciated by every up-to-date industrial and commercial establishment. The author of this work has written a very exhaustive treatise as to the proper methods of keeping cost accounts in so simple a manner as to be readily understood. A number of methods are explained fully and their merits compared. There are chapters devoted to sales and selling expenses and to summarizing results. A large number of forms are shown, these being copies of cards, loose leaves, etc., in actual use in manufacturing establishments. At the end of the work is a department devoted to factory reports and returns, those of the foreman, the superintendent, and the executives. These reports are analyzed in order to show the efficiency of the workmen, the expenses of idle machinery, and the general department efficiency. With these reports brought into practical use the proprietors or management can tell the progress of the business and its exact standing at the time these reports are made.

While this latter department is devoted practically to machine shops, there is much in it which is adaptable to any factory using machinery, and the book contains a greater amount of theoretical and practical matter regarding costs and cost accounting than one would imagine could be packed in a single

PHYSICAL AND CHEMICAL PROPERTIES OF GASOLENES SOLD
IN THE UNITED STATES FOR THE YEAR 1915. By
U. S. DEPARTMENT OF COMMERCE, BUREAU OF MINES.
U. S. GOVERNMENT PRINTING OFFICE, 1916.

This is the report of the investigation of government experts. It is mainly devoted to the study of values for combustion engines. Care has been taken to submit facts impartially, leaving to the reader the determination as to the superiority or inferiority of one kind over another for his individual purpose. Many tests were made—specific gravity, evaporation losses, calorific value, sulphur determinations, engine tests and content of unsaturated carbons. Eastern, Mid-Continent and California gasolenes were tested, as were also cracked gasoline, blended casinghead gasoline, and "straight" refinery product. The results are tabulated, and summarized, and make valuable reading. A fact that deserves mention is the undesirability of attempting to use motor gasoline as a solvent. This is shown by the high boiling points of some of the constituents in many gasolenes tested.

HANDBOOK OF CHEMISTRY AND PHYSICS. FIFTH EDITION.
Chemical Rubber Co., Cleveland, Ohio. [Cloth, 414 pages, 4 by 6½ inches. Price, \$2.]

This handbook is already known to many chemists in the United States, it being a favorite ready reference book of chemical and physical data. The fifth edition is a revision of the previous one, under the direction of Professors Charles B. Hodgman and M. F. Coolbaugh of the Department of Chemistry at Case School of Applied Science. Although small enough to fit easily in the pocket, it is packed full of chemical and physical facts and tables, so arranged as to be readily found. The present edition is about 60 pages larger than the previous one. Among the new features added is a new and more com-

plete table of gravimetric factors, and other important additions are a table of physical constants of the more common organic compounds and a five-place logarithm table. The book will be found very useful by every chemist and in every chemical laboratory.

NEW TRADE PUBLICATIONS.

J. P. DEVINE CO., manufacturer of vacuum dryers, solvent recovery apparatus, and other lines for similar purposes, has just published its "Miniature Bulletin No. 105," descriptive of apparatus required mainly by the chemical and allied industries, but containing some notice of apparatus used in rubber goods manufacture, chiefly autoclaves, kettles, and vacuum dryers. The bulletin is a small one, measuring about four by six inches, containing 32 pages, of which most of the left hand ones are blank. Each right hand page has a strikingly effective cut of one specialty, with a terse description, well displayed. A view of the experimental laboratory is interesting, and the pictures of the exterior and the interiors of the plant show the extent of the establishment.

* * *

The Southwark Foundry & Machine Co., Philadelphia, Pennsylvania, issues its catalog of valves and presses in a self-binder which enables its customers to keep it constantly up to date. Each page, 8½ by 11 inches, is devoted to one or more cuts and description of a single machine, the cuts being wonderfully well-executed half-tones from retouched photographs, and the descriptions comprehensive and accurate. The steam platen presses, tire-forcing presses, head presses, hydraulic heater presses, quick opening vulcanizer doors and other specialties for the rubber manufacturing industry are fully presented in the latest issue.

The Akron Rubber Mold & Machine Co., Akron, Ohio, is sending to the trade a very complete catalog of its specialties for tire building and tire manufacturing. This contains in its 48 pages practically every mechanical requirement for these important lines of industry. The machines and other items of equipment are well illustrated, the cuts showing finely all the details, and each is fully described. To give a list of these would demand more space than is available, but the catalog is one well worth securing and filing.

Gutta Percha & Rubber, Limited, Toronto, Canada, sends out its catalog of Maltese Cross Rubbers, season of 1917-1918, in a finely printed book of 64 pages, with covers handsomely illuminated with the trade-mark of the company. The styles and shapes are pictured in excellent half-tones, and the descriptive text is given in both English and French. With this is sent a smaller booklet, containing net prices, particulars regarding packing, and other information of the line.

* * *

"War Loans and the United States" is the title of an absorbing pamphlet, issued by the Guaranty Trust Co. of New York, which reviews the loans made by our own country in its wars, from the outbreak of the Revolution to the end of the Spanish war; deals with the general subject of loans in connection with the present war in Europe; and discusses our lessons of the past and economic opportunities of the future. Our phenomenal gain in export trade and resulting increase in financial strength is detailed, and the plain obligation imposed upon us in holding 30 per cent of the world's total supply of gold is pointed out. It is conclusively shown that "a lending policy on our part would not only prove a species of protective insurance, but in effect would remove us from the debtor nation class to which we have heretofore belonged and might raise us to the very pinnacle among creditor nations—a class whose commercial prosperity is assured

and whose foreign trade relations are most permanently established."

* * *

The American Asiatic Association is sending out its monthly magazine under a new title, "Asia," and in a new and very attractive shape. The number for March consists of 80 quarto pages, finely illustrated, containing articles of value to those interested in the Far Eastern trade. The present number is devoted almost entirely to China and Japan, though there is also an able article on the Philippines by Manuel L. Quezon, former resident commissioner of the Philippine Islands and now president of the senate of the first Philippine Congress.

* * *

The Diamond Power Specialty Co., Detroit, Michigan, sends us a finely printed pamphlet entitled "Increasing Today's Profits," exploiting the soot blower manufactured by that company. It contains some interesting matter as regards the saving of heat and power by elimination of soot deposit, and explains how this deposit acts as a heat insulator. Illustrations of factories where this system is in use, diagrams, recording charts, and ledger sheets are reproduced to prove the claims set forth in the booklet.

* * *

John Burnham & Co., 115 Broadway, New York City, have compiled for free distribution a statistical card which will be of interest to holders of motor and rubber stocks. It includes capitalization, par value, present bid and asked markets, dividend rate and date of payment, percentage earned, high and low prices for 1916 and the production of the year in number of cars or gross sales of the leading automobile, automobile accessory and rubber companies.

* * *

According to the latest census of motor vehicles in Great Britain, the total number of automobiles and trucks in actual service is 171,607, about 5 per cent of the number registered in the United States on January 1, 1917, which was 3,541,738. In each of the seven states of New York, Ohio, Pennsylvania, Illinois, California, Texas and Iowa, there are more automobiles and trucks than in all of Great Britain. In the United States the production of cars for 1916 was well over 1,600,000.

A recent number of "Class," a journal devoted to trade and class-journal advertising, has an interesting article by Julius S. Holl, advertising manager of the Link-Belt Co., Chicago, Illinois, which might well be read and even re-read by all who have charge of the advertising and sales departments of large or small industries. It is a sort of confidential talk based on the writer's experience over a wide field, and a profitable expenditure of hundreds of thousands of dollars in trade journals.

The "Charlotte (North Carolina) News" has published an issue of 88 pages, devoted almost entirely to descriptions of the many textile mills in that state. Each plant is treated individually, pictures and text giving a very complete and comprehensive review of the cotton mill industry. The work was done by an independent investigator, a trained newspaper man, and one of the main objects, evidently, is to rectify some of the impressions caused by sensational reports of the conditions of the mill-workers of the South. The paper is a credit to the enterprise of this daily publication, and is one which shows the prosperity and extent of the cotton weaving industry of the "Old North State."

The Underwriters' Laboratories "Electrical Data" gives a brief review of the institution, and the work carried on in 1916. Following this are described in detail fires and accidents reported due to electrical causes, with results of investigations. Illustrations of some of these accidents, also views of the laboratories are shown.

THE RUBBER ASSOCIATION OF AMERICA, INC.

AT a special meeting of firm members of the Association held March 7, 1917, the following amendments to the constitution and by-laws were adopted:

Amend Article VI, Section 2, by adding to the first paragraph the words "on which all persons connected with firm members in an official or executive capacity are eligible for appointment, unless otherwise provided."

Amend Article VI, Section 2, sub-division (a) by striking out the words "firm representatives," and substituting therefor the word "members."

Amend Article VI, Section 2, sub-division (b) by striking out the words "firm representatives," and substituting therefor the word "members."

Amend Article VI, Section 2, sub-division (c) by striking out the words "firm representatives," and substituting therefor the word "members."

Amend Article VI, Section 2, sub-division (d) (see our circular letter of December 22, 1916) by striking out the words "by them selected, or" in the fourth line of the third paragraph; by striking out the word "their" in the seventh line of the third paragraph and substituting therefor the words "the disputants"; by inserting the words "named in the said List of Official Arbitrators" after the words "Any two persons" in the fifth paragraph; by striking out the words "said List of Official Arbitrators" in the second line of the fifth paragraph and substituting therefor the words "the same source"; by striking out the word "arbitrators" in the same paragraph and substituting therefor the word "umpire."

Amend Article VI, Section 2, sub-division (d) by striking out the sixth paragraph entirely.

Amend Article VI, Section 2, sub-division (e) by striking out the words "either firm representatives or."

Amend Article VI, Section 2, sub-division (f) by striking out the words "either firm representatives or."

These amendments cause the entire Section 2 of Article VI to read as follows:

Section 2. Standing Committees. The Board of Directors or the Executive Committee shall annually appoint the following Standing Committees on which all persons connected with firm members in an official or executive capacity are eligible for appointment, unless otherwise provided:

(a) A Committee on Nominations, to consist of five members, who shall prepare and send to each "Firm Member" at least 30 days before the annual meeting a list of persons nominated by them for directors to be voted upon at the annual meeting; but any other members eligible to hold office, as provided in Article III hereof, may be nominated for election at the annual meeting, provided a written request therefor is received from 20 members and is in the hands of the Secretary in time to be sent to each "Firm Member" at least 15 days before the date of the annual meeting.

(b) Auditing Committee to consist of two members, who shall annually audit the accounts of the Treasurer.

(c) Committee on Legislation to consist of three members, who shall keep in touch with local, State and Federal legislation affecting the rubber industry; to secure copies of bills and report thereon to the Executive Committee or the Board of Directors whenever in its opinion it may deem necessary.

(d) A committee on arbitration to consist of seven members, four of whom shall be manufacturers and three crude rubber importers or brokers. The chairman of such committee shall be chosen by the members from their own number for a term of three years, and the term of each of the additional members shall be three years, except that at the time when this Committee shall be originally appointed the six members then appointed, other than the chairman, shall decide by lot which of their number shall serve for periods of one, two and three years, respectively, two members of the Committee being assigned to each class, and that thereafter two members shall be appointed by the Board of Directors or by the Executive Committee in each year. If any vacancies should occur in this Committee, such vacancies may be fulfilled by the Board of Directors or by the Executive Committee at any regular or special meeting.

DUTIES.—This Committee shall have complete supervision in respect to all matters for arbitration referred to The Rubber Association of America, Inc., and shall make rules and regulations for the conduct and disposition of all matters

submitted to arbitration subject to the approval of the Board of Directors or of the Executive Committee. It shall provide a form of agreement not inconsistent with existing provisions of law, which, so far as practicable, the decisions of the arbitrator or arbitrators shall be as effective as judgments of the Supreme Court of the State of New York. It shall compile and from time to time revise and keep a list of qualified persons, not less than 25, willing to act as arbitrators under these rules, and who shall be members of The Rubber Association of America, Inc. This list shall be known as "The List of Official Arbitrators of The Rubber Association of America, Inc."

Any matter in controversy may be referred to arbitration by the disputants signing the form of agreement provided by the Committee, together with a stipulation to the effect that they will abide by the decision of the arbitrator or arbitrators, selected by the Arbitration Committee, and waiving any and all rights to withdraw from such submission after the acceptance of their appointment by the arbitrator or arbitrators selected, and designating at the disputants' selection of either of the two following options:

(1) One of the persons named in said List of Official Arbitrators, who shall act as sole arbitrator; or

(2) Any two persons named in the said List of Official Arbitrators to act as arbitrators, who in turn shall designate from the same source a third person to be associated with them as umpire.

The Committee on Arbitration shall, from time to time, establish a schedule of moderate fees to be paid in all matters submitted, which fee shall be chargeable as decided by the arbitrators.

The Secretary of The Rubber Association of America, Inc., shall be the Clerk of the Committee on Arbitration.

(e) A Banquet Committee, to consist of three members, who may be Associate Members.

(f) An Outing Committee, to consist of three members, who may be Associate Members.

CHANGE IN THE BRITISH RUBBER GUARANTEE.

The British Government has slightly altered the rubber importers' guarantee by substituting the words "sell or deliver" for the word "sell," in the seventh line of the second paragraph. This change has been made necessary because of rubber having been consigned to New York firms as "bailees," without their knowledge or consent.

DIVISION MEETINGS.

The Rubber & Fibre Sole Division met at the Association rooms, March 9; W. H. Yule of The B. F. Goodrich Co., Akron, Ohio, presided. A good attendance and a very satisfactory meeting was reported.

The Rubber Reclaimers Division held a meeting in the Association rooms March 13. In the absence of Francis H. Appleton, Clark W. Harrison, Bloomingdale Rubber Co., New York City, presided. Matters pertaining to extension of the division's activities were discussed and committees appointed.

EXPORT TRADE DIVISION FORMED.

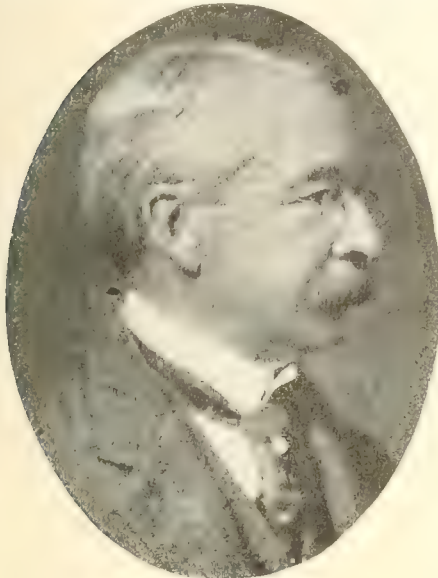
At a recent meeting of the Board of Directors it was voted to extend to the member manufacturers the opportunity of organizing an Export or Foreign Trade Division similar in scope and intent to the other trade divisions of the Association already in existence. Pursuant to this vote a meeting was held in the Association rooms March 21. There were 25 export managers present and W. V. Logan, of the McGraw Tire & Rubber Co., was elected chairman. The following Committee on Nominations was appointed: John Macfadyean, chairman, Good-year Tire & Rubber Co., New York City; C. O. Brandes, Firestone Tire & Rubber Co., Akron, Ohio; Henry G. Tyer, Tyer Rubber Co., Andover, Massachusetts. The Committee on By-Laws follows: D. H. Broadwell, chairman, The Fisk Rubber Co., Chicopee Falls, Massachusetts; C. E. Wagner, Miller Rubber Co., Akron, Ohio; E. H. Huxley, United States Rubber Export Co., Limited, New York City; G. C. Chalmers, Hodgman Rubber Co., Tuckahoe, New York; A. S. Hardy, Manhattan Rubber Manufacturing Co., New York City.

The Obituary Record.

HEAD OF A GREAT WIRE CONCERN.

FERDINAND W. ROEBLING, treasurer and general manager of the John A. Roebling's Sons Co., Trenton and Roebling, New Jersey, died at his home in the former city March 16, aged 75 years.

Mr. Roebling was born February 27, 1842, at Saxonburgh, Pennsylvania, where his father, John A. Roebling, established the first wire rope mill in the United States. Six years later, this business was removed to Trenton, and the family has resided there ever since. Ferdinand W. Roebling graduated from the Polytechnic College and immediately became associated with his father, becoming later treasurer and general manager of



F. W. ROEBLING.

the company, which under his direction he saw grow from small beginnings to one of the important industries of this country, employing 7,000 hands.

Foreseeing the importance of electrical progress, he developed the insulated wire and cable branch of the business to its present proportions, and cables made by this concern carry messages under every ocean on the globe.

But Mr. Roebling was also actively identified with a number of other industries. He was treasurer of the New Jersey Wire Cloth Co., president of the Union Mills Paper Manufacturing Co., vice-president of the Syracuse, Rochester and Eastern Railway Co., director of the Mechanics National Bank of Trenton, of the National Copper Bank of New York, of the Merchants and Metals National Bank of New York, of the Mercer Automobile Co., of the Otis Elevator Co., of the Trenton Street Railway Co., of the Interstate Railways Co., of the Trenton Brass and Machine Co., of the Standard Fire Insurance Co., of Trenton. Mr. Roebling's influence in the world of finance was nationally recognized. Several years ago he was selected as a director of the Equitable Life Assurance Society.

Mr. Roebling, though politically influential, never sought public office. He was a delegate to several Republican National Conventions, but he held no important office except as president of the Trenton Free Public Library, and as a member of the commission which built the Trenton City Hall. It was through Mr. Roebling's influence that the Free Public Library was instituted and built, and his interest in that institution continued up to the time of his death.

He had many hobbies. He was an enthusiastic hunter and fisherman. He won many prizes as a marksman. He was fond of automobiling. He conducted a chicken farm, and later interested himself in raising blooded cattle. He was one of the moving spirits in organizing the Trenton Country Club.

He was a man of strong likes and dislikes. His predominant characteristics were reserve and energy. He was a deep thinker and a man of few words. He loved companionship of

those in whom he was interested. He had decidedly individualistic ideas about all things, and he applied this trait in many striking ways. He used his wealth freely for the advancement of causes which appealed to him, but while some of his charities are known, he helped many causes, while enjoining secrecy.

Mr. Roebling was a member of the Union League of Philadelphia, the Engineers' Club of New York, the Lotus Club, the Trenton Country Club and of the Carteret Club of Trenton.

He is survived by two sons and two daughters, also by his mother, three brothers and one sister. His wife died several years ago.

KNOWN IN THE RUBBER STAMP TRADE.

Mrs. Margery S. Stewart, president and treasurer of R. A. Stewart & Co., Inc., New York City, dealers in hand stamp supplies, and president of the Hill-Independent Manufacturing Co., of Philadelphia, Pennsylvania, died in the latter city, after a long illness, March 6. She was born in New York City in 1863, was a graduate of Hunter College, and had been connected with the stamp trade as far back as 1881, and actively engaged in the business since 1900. She was an able business woman, personally directing the concerns with which she was connected, and besides this, was actively engaged in practical philanthropic work, in which she made many friends who deplore her loss.

FORMERLY IN THE RUBBER TRADE.

William Dwight Shattuck died at Boston, Massachusetts, March 19, aged 55 years. He was born in Roxbury, now a part of Boston, and for a number of years was connected with the boot and shoe business there and in Newburyport. Later, for a number of years, he was with Parker, Stearns & Co., manufacturers of druggists' and surgical sundries, Brooklyn, New York, leaving their employ about four years ago to locate at Spofford, New Hampshire, to superintend the interests of E. Ward Stearns, of the above named firm, who owns a hotel at that place. Mr. Shattuck was a member of several Masonic bodies. He is survived by a sister. Interment was at Spofford, New Hampshire.

FORMERLY A RUBBER STAMP MANUFACTURER.

George Moss, for several years a rubber stamp manufacturer in New York City, died at his residence in Brooklyn, New York, March 21, aged 58 years. He was a member of several Masonic bodies, and had attained to the thirty-second degree. He left a widow, three sons and a daughter.

RED OXIDE OF IRON COMING FROM SPAIN.

Notwithstanding the great production of red oxide of iron in the Marquette region of Lake Superior, so heavy has been the demand that a steady increase is noted in imports of this mineral pigment from Spain. The beginning of this movement was a single shipment, in 1901, to the value of \$52.50. In 1905 the figures had grown to \$870, and in 1910 had increased to \$5,186. Since then, shipments have rapidly increased, and in the first nine months of 1916 shipments of this substance to the value of \$55,588 had been made, and a far greater record would have been shown for the year had there been normal shipping accommodation.

This enormously increased demand is caused by its being substituted for red oxide of lead, not only for paint manufacture but also in many industries. Red lead is quoted at about \$350 a metric ton, while Spanish red oxide of iron is sold around \$27 per metric ton. Malaga is the principal port of export.

Interesting Letters from Our Readers.

RUBBER PACKING SUGGESTIONS FROM AN EXPERT.

TO THE EDITOR OF THE INDIA RUBBER WORLD:

DEAR SIR—I read with great interest in your issue of January 1, 1917, the advice given by The Rubber Club of America, Inc., about plantation rubber packing, and I am quite sure that the suggestions will be useful. Of course it stands to reason that the suggestions made by the manufacturers deal only with the manufacturing side of the question, and it will be impossible for many growers to deal with some of them in a practical way.

Allow me to give you my views on the subject.

No. 1. Experience has proved that in the tropics neither paper, cloth, straw nor dry leaves should be placed inside a package to contain crude rubber, either wild or plantation. Therefore, I cannot agree with suggestion No. 2, viz., that rubber should be packed in muslin. It is suggested in No. 3 that boxes should be made to hold 200 to 300 pounds. It is quite impossible to ask rubber growers to make a general rule of this; it is a question of transport. The best weight to adopt is what the average adult coolie can handle somewhat by himself. On the other hand, too much rubber in a parcel brings a pressure on the stuff, which for some grades is not at all beneficial. The size adopted by the Venesta chest is practical, and meets most of the requirements. It is both light and very strong.

In No. 17 I notice that some species of tropical woods are suggested. I am of the opinion that some of our tropical woods are of a too hard and breakable character.

No. 21 is very good advice indeed, viz., "store away from the light," but I should add "and the sun."

Talc or soapstone should be freely used in chests when placing the rubber inside.

The great enemies of crude rubber, either plantation or wild, are: The tropical sun, a bad warehouse, defective packing and bad curing.

G. VAN DEN KERCKHOVE.

London, February 15, 1917.

AMERICAN CAPITAL IN EASTERN PLANTATIONS.

TO THE EDITOR OF THE INDIA RUBBER WORLD:

DEAR SIR—Like the United States, as recounted in THE adverse views expressed through the columns of newspapers here on the so-called "American invasion" in the field of rubber production in the Malay Peninsula. But few, if any, editorials or written opinions I have seen so far have apparently considered what such a vast and permanent improvement as the conversion of thousands of acres of waste jungle lands would be, not to mention the great expenditure of foreign gold this conversion would require. It would be outside foreign capital not earned nor coined in the Far East, but voluntarily expended here in wages and materials; also the extra capital it would take to operate the plantations for all future time, which would mean a large and continual expenditure in payrolls for the employment of labor and upkeep, which, in a measure, would mean continued prosperity.

The sale of the product of the present plantations would not be disturbed, as the demand of factory consumers of the world, and especially in America, keeps apace, indeed, if not in advance of the production. In the interim between planting and maturing the trees to bearing, this locality would have the use of the large sums so expended in the project, which in itself would mean a degree of prosperity.

Do the inhabitants of this most (rubber) favored spot on earth realize how much America has contributed to their prosperity?

Do they realize what is the cause of the American demand for rubber? Are they expressive of appreciation for the unbroken stream of gold flowing from America into their exchequer and thus making many millionaires here?

Let me direct attention to the year 1916. The most accurate figures obtainable at this time show there was probably an excess of 160,000 tons of plantation rubber produced in the Far East, most of it on this peninsula. Seventy per cent, or 112,000 tons, was consumed by America. This is 250,880,000 pounds. It was marketed (conservative estimate) at 60 cents gold "all in" per pound, for which America paid \$150,528,000 gold—over £30,000,000. Is there any thinking citizen opposed to her further contribution and building up in permanent improvement portions of this peninsula, where man-eating tigers and crocodiles now reign supreme?

The cause of the demand for rubber by America is the automobile, where 83 per cent of the world's supply is manufactured. Yet the British Government has passed recently laws so levying taxes against American automobiles as to hamper if not discourage their importation into portions of its dominions and dependencies, and gives as a reason the discouragement of luxurious extravagance of its citizens during war times. I am informed in the dependency of India further importation of American automobiles is prohibited. The result cannot but be a discouragement of America's rubber purchases which the tabooed automobile encourages. Is it not, indeed, an indirect expression of unappreciation of what America has done and is doing for the rubber industry and the Malay Peninsula?

Singapore, January 7, 1917.

JESSE E. LA DOW.

KLINGERIT SUBSTITUTES IN ENGLAND.

TO THE EDITOR OF THE INDIA RUBBER WORLD:

DEAR SIR—Like the United States, as recounted in THE INDIA RUBBER WORLD of March 1, 1917, England and France felt the need of Klingerit high-temperature steam packing soon after the beginning of hostilities in Europe which cut off the source of supply in Austria and Germany. Our asbestos firms had undertaken its production many years ago with considerable success, but none of the rubber works had been able to compete with the imported article. Exactly what success those rubber firms who took up its manufacture two years ago have attained does not yet seem to have become common knowledge. A great difficulty was the analysis, which was difficult and, indeed, by many chemists considered impossible.

A few months ago, however, I was interested to note that M. Dubosc in "Le Caoutchouc & la Gutta-Percha" gave the results of an analysis of Klingerit as follows: Asbestos, 80.46 per cent; flax, 2.24 per cent; rubber, 5.19 per cent; balata, 11.97 per cent; sulphur, 0.13 per cent. The rubber and balata form the agglutinant whereby the compound layers of asbestos mixed with flax fibers are held together. The interesting point about this analysis is that rubber and balata figure separately with the meticulous accuracy of the second place of decimals. I do not wish in my ignorance to throw any doubt on the analyst, but I always understood that no method was available by which the balata content of a rubber compound could be accurately determined. When it is known that they occur together—and that they do so in Klingerit is generally understood—it has been possible to give a rough approximation of the amount of each, but Weber's statement that our knowledge does not permit us to separate them is generally accepted, though of course rubber analytical methods have made great advances since Weber's book was written.

A RUBBER STUDENT.

London, March 15, 1917.

News of the American Rubber Trade.

SIXTEEN DIRIGIBLES FOR THE NAVY.

THE Navy Department of the United States Government has ordered 16 dirigible airships for coast and harbor patrol work, at a cost of \$649,250. These are to be of the non-rigid type, 160 feet long, 31½ feet in diameter, or 50 feet high over all, and will be equipped with 100-horsepower motors, capable of making a continuous flight of 16 hours at 35 miles per hour and a maximum speed of 45 miles for 10 hours.

The awards were as follows: Curtis Aeroplane Co., Buffalo, New York, three for a total of \$122,250; Connecticut Aircraft Co., New Haven, Connecticut, two for \$84,000; The B. F. Goodrich Co., Akron, Ohio, two for \$83,000, and The Goodyear Tire & Rubber Co., Akron, Ohio, nine for \$122,250.

HOOD RUBBER CO. REPORT.

Following is the condensed balance sheet of the Hood Rubber Co., Watertown, Massachusetts, dated December 31, 1916:

ASSETS.

Plant (real estate, machinery, etc.)	\$ 700,000.00
Merchandise	1,846,308.71
Accounts receivable	2,881,810.80
Cash	318,180.68
Investments in other corporations	152,400.00
Patents	1,000.00

\$8,606,700.19

LIABILITIES.

Capital stock—Common	\$7,800,000.00
Preferred	27,000.00
Notes payable	80,000.00
Surplus	1,076,700.19

\$8,606,700.19

Merchandise in process of importation and letters of credit and drafts discounted in connection therewith are not included in the foregoing statement.

AMERICAN CHEMICAL SOCIETY MEETING.

The general meeting of the American Chemical Society, to be held in Kansas City, Missouri, April 10 to 14, promises to be one of the most interesting in the history of that organization. It will be the first for many years held in that section, where are situated many of the nation's chemical industries, especially those relating to natural gas, petroleum and zinc. There are to be symposiums on these subjects, and important excursions are planned for personal visits and investigations in the fields above mentioned, as well as visits to industrial plants with which chemistry is more or less closely allied. The local committee is headed by W. A. Whitaker, of the University of Kansas, Lawrence, Kansas, chairman of the executive committee.

DOMINION RUBBER SYSTEM CHANGES.

A recent announcement of the Canadian Consolidated Rubber Co., Limited, Montreal, Canada, reports the following appointments, effective February 12:

R. E. Jamieson, director in charge of sales of Dominion Rubber System; J. M. S. Carroll, sales manager, Dominion Rubber System; F. A. Todd, general credit manager, Dominion Rubber System; Hugo Wellein, division manager, Quebec division; Geo. Bergeron, assistant division manager, Quebec division; H. R. Nixon (St. John branch) becomes chief clerk to director in charge of sales at head office; and A. R. Hannah, office manager, St. John branch.

The rapid expansion of business in western Canada has made necessary a rearrangement of the Middle West division. Two new divisions have been created, with a result that each prairie province has become a distinct unit:

Alberta Division—Division office, Calgary, Alberta; division manager, A. C. McGiverin; office manager, J. C. Jones.

Saskatchewan Division—Division office, Regina, Saskatchewan;

division manager, L. T. McGiverin; office manager, Frank Garnett.

Manitoba Division—Division office, Winnipeg, Manitoba; in charge of Charles Holden, western sales manager; office manager, J. H. Rice.

ASSOCIATION SPONSORS BRAKE LINING TESTS.

The Asbestos Brake Lining Manufacturers' Association, Ambler, Pennsylvania, organized July 28, 1916, endeavors to aid manufacturers' interests by bettering the service to the trade in general, and is now preparing the way for disinterested testing of all brake band linings. This work will be done by recognized experts, and is expected to demonstrate that brake lining of a certain stipulated construction, quality, etc., is best suited for given requirements. The Society of Automobile Engineers has been invited to cooperate and it is hoped to render a real service to the motoring public at large.

The president of this association is A. H. Burdick, treasurer of the Standard Woven Fabric Co., Walpole, Massachusetts, and the secretary-treasurer is C. J. Stover, vice-president of Keasbey & Mattison Co., Ambler, Pennsylvania.

RUBBER COMPANY'S DIVIDENDS.

The Goodyear Tire & Rubber Co. paid its usual quarterly dividend of 3 per cent on the common stock on March 1.

The New Jersey Zinc Co. paid an extra 4 per cent dividend on March 10.

The Fisk Rubber Co. paid a quarterly dividend of 1¾ per cent on second preferred stock on March 15 to stockholders of record January 31.

The Ajax Rubber Co., Inc., paid a quarterly dividend of \$1.25 on March 15 to stockholders of record February 28.

The Pennsylvania Rubber Co. has declared a quarterly dividend of 1½ per cent on common and 1¾ per cent on preferred stock, payable March 31 to stockholders of record March 15.

The Kelly-Springfield Tire Co. has declared a quarterly dividend of \$1.50 per share on preferred stock, payable April 2 to stockholders of record March 17.

The Rubber Goods Manufacturing Co. paid a quarterly dividend of 1¾ per cent on preferred stock on March 15 to stockholders of record March 10.

The board of directors of the Keystone Tire & Rubber Co. has declared a quarterly dividend of 2 per cent with an additional ½ per cent upon preferred stock and a regular quarterly dividend of 3 per cent on common stock, payable April 2 to stockholders of record March 23.

The Federal Rubber Co. has declared a quarterly dividend of 1¾ per cent on first preferred stock, payable April 1 to stockholders of record March 17.

RUBBER COMPANY SHARE QUOTATIONS.

The following market quotations of shares of rubber manufacturing companies on March 26 are furnished by John Burnham & Co., 115 Broadway, New York City, and 41 South La Salle Street, Chicago, Illinois:

	Bid.	Asked.
Goodyear Tire & Rubber Co., common	107	109
Firestone Tire & Rubber Co., preferred	107	109
The B. F. Goodrich Co., common	98	100
The B. F. Goodrich Co., preferred	105	107
Goodyear Tire & Rubber Co., common	98	100
Kelly-Springfield Tire Co., common	93	94
Kelly-Springfield Tire Co., preferred	93	94
Miller Rubber Co., common	105	106
Miller Rubber Co., preferred	105	106
Portage Rubber Co., common	179	182
Swanwick Tire & Rubber Co., common	70 1/2	71
United States Rubber Co., common	107	109
United States Rubber Co., preferred	107	109

TRADE NOTES.

The capital stock of the Ohio Rubber Co., Cleveland, Ohio, has been increased from \$300,000 to \$400,000, to care for a growing volume of business. This company also operates branches at Cincinnati, Ohio, and Detroit, Michigan.

The Brighton Mills, manufacturer of cotton and special fabrics, Passaic, New Jersey, has increased its capital stock from \$3,000,000 to \$4,500,000, \$1,500,000 of this increase being in preferred and \$3,000,000 in common stock. The company states that owing to the enhanced value of raw material and finished products, this additional capital is needed to finance the business properly.

The Dryden Rubber Co., Chicago, Illinois, has just completed a large two-story addition of reinforced concrete construction to care for the marked increase in its fiber sole and rubber heel business.

At the recent annual meeting of the I. B. Kleinert Rubber Co., New York City, officers were elected as follows: Victor Guinzburg, president; H. A. Guinzburg, vice-president and treasurer, and A. B. Salinger, secretary.

Alterations and improvements now in progress at the plant of the Chicago Insulated Wire & Manufacturing Co., Sycamore, Illinois, will cost approximately \$75,000, and include many new machines of special designs.

The Dupont Fabrikoid Co., which recently purchased the plant of the Fairfield Rubber Co., Fairfield, Connecticut, is erecting a large addition to that plant. The enlargement is an extensive one, and it is expected that it will not be completed for several months.

The New Jersey Zinc Co., New York City, has elected the following directors: Charles W. Cox, William P. Hardenbergh, August Hecksher, Thomas D. Jones, Edward S. Marston, Edgar Palmer, John J. Riker, Edwin M. Squier and A. B. Schultz.

The United States Rubber Co., New York City, will open two new branches shortly. One, in Manila, Philippine Islands, will be in charge of Charles E. Guest, formerly with the Mexican branch of the business. This new office will handle a portion of the Oriental trade of the company, hitherto under the direction of the San Francisco, California, branch. The other branch, in Australia, will be under the management of J. A. McKenzie.

The Winnsboro Mills, Winnsboro, South Carolina, formed last summer under South Carolina laws to take over the Fairhaven Mill of the Hampden Cotton Mills Co., has changed to a Massachusetts corporation, increasing the capital stock to \$900,000. On February 1 work began on a large addition to the plant, and when this is completed, probably about July 1, the product will be changed from print cloths to novelty tire fabrics. Ten thousand new spindles will be installed, bringing the total up to 35,000. Five hundred looms are now operated, and this number will be increased, although to what extent is not known at this time. J. Pennington Gardiner, 60 Federal street, Boston, Massachusetts, is the purchasing agent for the company, which is under the management of Lockwood, Greene & Co.

The board of directors of The Barrett Co., New York City, has voted to increase the capital stock of the company from \$20,000,000 to \$37,500,000, such stock when increased to consist of \$25,000,000 of common stock divided into 250,000 shares and \$12,500,000 of preferred stock divided into 125,000 shares of the par value of \$100 each.

J. Early Wood, Inc., manufacturer and exporter of chemicals, New York City, has taken over the exclusive sales control of the L. & R. Organic Products Co., Inc., of Elizabeth, New Jersey, which manufactures nigrosine. The Wood company's own line includes several shades of spirit, oil and water soluble material in powder and crystals.

The Ravenna Rubber Co., Ravenna, Ohio, has increased its capital stock from \$100,000 to \$250,000. This additional capital is needed to finance the increased volume of business resulting from the company's purchase of the entire druggists' sundries

equipment of The Star Rubber Co. The officers and directors of the Ravenna company are as follows: S. K. Elliott, president and treasurer; R. W. Beebe, secretary; L. A. Ritzman, E. H. Sniffin, K. M. Elliott and M. H. Beebe. An existing vacancy in the directorate will be filled at the next meeting of the company.

The New York City sample room of the Davol Rubber Co., Providence, Rhode Island, has been removed from 299 Broadway to 302 Broadway, where more commodious quarters and better facilities for display are afforded.

The Rubber Waste Co., New York City, will be located temporarily at 247 East One Hundred and Thirty-seventh street, pending the completion of its new office and warehouse at Lincoln avenue and One Hundred and Thirty-fifth street.

The Seamless Rubber Co., New Haven, Connecticut, has been placed in the hands of a receiver, Vernal W. Bates, on an application in which 97 per cent of the creditors joined.

Lockwood, Greene & Co., Boston, Massachusetts, announce the resignation of P. T. Jackson, Jr., as an officer of the Bay State Cotton Corp., Lowell, Massachusetts, and Boston Yarn Co., Boston, Massachusetts, to associate himself with other interests, and the appointment of Allan B. Greenough as treasurer of the Bay State Cotton Corp. and president of the Boston Yarn Co.

The Passaic Cotton Mills, Passaic, New Jersey, has acquired the remaining cotton mills of the New England Cotton Yarn Co., at New Bedford, Massachusetts. They are equipped with 36,000 spindles for the manufacture of tire fabrics. The plant will be operated under the name of the New Bedford Spinning Co., recently incorporated under Massachusetts laws with a capital of \$200,000.

RUBBER TRADE INQUIRIES.

THE inquiries that follow have already been answered; nevertheless they are of interest, not only in showing the needs of the trade, but because of the possibility that additional information may be furnished by those who read them. The editor is therefore glad to have those interested communicate with him.

[286.] A correspondent wishes to be placed in touch with manufacturers of a magnetic separating machine for separating rubber from wire.

[287.] A complete estimate is desired of machinery needed for the manufacturing of rubber heels, soles and similar goods, based on using guayule rubber.

[288.] A Japanese company desires to import reclaimed rubber, substitutes, and chemicals for rubber manufacturing; and is also in the market for tire machinery and machinery for proofing fabrics.

[289.] A consumer desires to place an order for red atomizer bulbs.

[290.] Names of makers of golf-ball machinery are requested.

TRADE OPPORTUNITIES FROM CONSULAR REPORTS.

A firm in Switzerland is in the market for india rubber cloth for printers. Report No. 23,870.

A shoe dealer in Spain wishes to purchase rubber soles and heels. Report No. 23,878.

Representation of American manufacturers and exporters of druggists' sundries is sought by a firm in Colombia. Report No. 23,971.

Catalogs and full information from American manufacturers of rubber raincoats are desired by a firm in Java. Report No. 24,003.

An agency is desired in Spain for boxes of rubber type, rubber stamps, etc. Report No. 24,040.

An applicant in the West Indies desires to be placed in communication with American manufacturers of elastic webbing. Report No. 24,043.

PERSONAL MENTION.

Charles R. Sargent, formerly connected with Innis, Speiden & Co., has severed his connections with that concern and entered the firm of Stresen-Reuter & Hancock, Inc. The latter company has opened offices and a warehouse at Cleveland, Ohio, where Mr. Sargent will maintain headquarters.

R. J. Parkell, formerly connected with the Hoffman-La Roche Chemical Works, is now associated with the St. George Chemical Co., Inc., 99 John street, New York City, as manager of the chemical department.

Frank A. Mayo, for 18 years manager of the rubber shoe department of Clark-Hutchinson Co., wholesale shoe merchants, Boston, Massachusetts, has tendered his resignation, to become vice-president and treasurer of H. B. Hanford & Co., leather and rubber footwear wholesalers, Philadelphia, Pennsylvania.

W. F. Enright, manager of the Minneapolis branch of the United States Rubber Co., New York City, was a speaker at the first annual convention of the Minnesota Retail Shoe Merchants' Association at Minneapolis last month. J. J. Hawkins, president of the Standard Shoe & Rubber Co., another speaker, gave an interesting talk on the rubber trade and explained the process of manufacture of rubber footwear, exemplifying this process by making a rubber boot before his audience.

Earle Brothers, New York City, announce that Russell W. Earle has become a member of the firm.

F. Y. Horn has been appointed district manager for the Amazon Rubber Co., Akron, Ohio, in the Central West, with headquarters at Chicago, Illinois.

Harry T. Dunn, president of The Fisk Rubber Co., Chicopee Falls, Massachusetts, has resigned his position of vice-president of the Willys-Overland Co., of Toledo, Ohio, to give his attention solely to the tire business of the Fisk company, and of the Federal Rubber Co., of Cudahy, Wisconsin, of which he is also president.

John W. Maguire, for several years Chicago branch manager for the Republic Rubber Co., Youngstown, Ohio, has resigned that position to become general sales manager of the Brunswick-Balke-Collender Co., Chicago, Illinois.

A. W. Senz, manager of the Chicago, Illinois, branch of The Gordon Tire & Rubber Co., has been transferred to the main office of the company at Canton, Ohio, as manager of sales of the tire and tube department, and is succeeded by C. H. Kenyon, late with the Ajax Rubber Co.'s Chicago branch.

A. I. Butler, formerly with the Batavia Rubber Co., Batavia, New York, succeeds W. A. Young, former manager of the New York City branch of The Gordon Tire & Rubber Co. Canton, Ohio.

W. H. Batcheller, president of the Akron Tire Co., Inc., of New York City, has been touring through the South by motor car, spending most of the winter in Florida. He speaks highly of the excellent roads now finished and others being built and resurfaced in that State.

Percy W. Rairden has been appointed sales manager for the Savage Tire Corp., of San Diego, California. Mr. Rairden brings to the Savage company a broad business experience, including first-hand knowledge of conditions in the foreign rubber-producing centers.

MCGRAW COMPANY APPOINTMENTS.

Changes in the personnel of the McGraw Tire & Rubber Co., East Palestine, Ohio, are as follows: R. G. Nelson has been made assistant sales manager, with headquarters at East Palestine. W. V. Logan, former district manager at St. Louis, Missouri, is now district manager of the New York territory, being succeeded in St. Louis by C. E. Pumphrey, former district manager of the Atlanta, Georgia, territory. Former representative, T. J. Harris, succeeds Mr. Pumphrey.

CANADIAN CONSOLIDATED BOND ISSUE.

At a special general meeting of shareholders of Canadian Consolidated Rubber Co., Limited, held at the head office, Montreal, on February 14, the directors were authorized to issue first and refunding mortgage gold bonds to the amount of \$8,000,000. This issue is to retire debentures amounting to \$2,500,000, which fall due in 1918, to liquidate bank advances and to provide funds for further expansion of business.

The Canadian Consolidated Rubber Co.'s business has expanded far beyond the ideas entertained when the first financing was carried out in 1906. This expansion necessitated temporary financing measures from time to time. The present issue of bonds consolidates this financing and permits continued growth.

ADDITION TO STANDARD UNDERGROUND CABLE CO.'S PLANT.

The Standard Underground Cable Co. of Canada, Limited, is making an addition to its factory at Hamilton, Ontario, which, when completed and equipped with the necessary machinery, will represent an investment of \$50,000.

The new structure will be devoted exclusively to the uses of the wire drawing department and consists of one story with



basement built of brick and concrete and is 125 by 120 feet in dimensions, which gives a total increase in floor space of 30,000 square feet. It is most modern in type and equipped to secure the lighting, heating and ventilation necessary to the best working conditions. Ample fire protection apparatus is also provided for, which includes a complete automatic sprinkler system.

CROMPTON & KNOWLES ELECTIONS.

At the recent annual meeting of the Crompton & Knowles Loom Works, Worcester, Massachusetts, Charles H. Hutchins retired as president of the concern and Lucius J. Knowles was elected to succeed him.

Other officers and directors elected are: Vice-presidents, Earl E. Howard, Irving H. Verry and Frederic W. Howe; treasurer, Edward F. Green; assistant treasurer, Fred J. Bowen; clerk, Earl E. Howard; general manager, John F. Tinsley; general counsel, Charles M. Thayer.

KELLY-SPRINGFIELD TIRE CO.

The Kelly-Springfield Tire Co., New York City, has purchased the Northland Rubber Co. plant at Buffalo, New York. The Kelly-Springfield company is to build at Cumberland, Maryland, but the purchase of the Buffalo plant will enable an immediate increase in production for the present season, pending the completion of the Cumberland plant.

At the annual meeting of the company held on March 13, at 15 Exchange place, Jersey City, New Jersey, directors were re-elected as follows: Van H. Cartmell, Stephen Peabody, Arnold L. Scheur, Jacob Oppenheim, Gustavus Maas, Austin M. Poole, Frederick A. Seaman, and Otis R. Cook.

NEW INCORPORATIONS.

American Tire Filler Co., January 11 (Washington), \$300,000. W. J. Michelet (president), Portland, Oregon; Fred Watson (vice-president), Tacoma; R. S. Wicks (secretary and treasurer), Mt. Vernon—both in Washington. Principal office, Mt. Vernon, Washington. To manufacture tire fillers, tires and accessories.

Appleton, F. H., & Son, Inc., March 3 (Massachusetts), \$400,000. Francis H. Appleton, Francis H. Appleton, Jr., and Frank Tent—all of 185 Summer street, Boston, Massachusetts. Rubber reclaiming, and to manufacture and deal in rubber and rubber compounds, substitutes and products, including boots, shoes and rubber goods.

Automatic Eraser Co., Inc., March 20 (New York), \$10,000. Edward Lewers, Edward N. Walter and Dewitt C. Moore—all of 29 Broadway, New York City. To deal in office supplies.

Blackstone Tire & Rubber Co., Inc., March 13 (New York), \$3,000. Walter Loewenthal, 35 Nassau street, New York City, and C. A. Weldon, 591 Seventh street, and H. H. Jacobson, 555 Grand street—both in Brooklyn, New York.

C. A. Breitenstein Tire Corporation, March 1 (New York), \$55,000. C. A. Breitenstein, M. R. Breitenstein, F. H. Robbins—all of 528 Greene avenue, Brooklyn, New York.

Cleveland Standard Tire & Rubber Supply Co., February 14 (Pennsylvania), \$10,000. John C. Sinn, Pittsburgh, and George R. Mailey and Myles McConnon, Homestead—both in Pennsylvania. Principal office, Pittsburgh, Pennsylvania. To manufacture and deal in automobiles, accessories, etc.

The Colonial Rubber Co., February 20 (Massachusetts), \$25,000. John J. Conway, 503 Huron avenue, Cambridge, and Charles B. Hamilton and Elsie O. Hamilton, 56 East Walnut street, Taunton—both in Massachusetts. To manufacture rubber heels and soles, chemicals and footwear, and to do and deal in rubber reclaiming.

Commonwealth Tire Corporation of America, March 14 (Delaware), \$2,500,000. Martin E. Smith, T. Morley Smith and Artemas Smith—all of Wilmington, Delaware. Principal office Wilmington, Delaware. To manufacture master aluminum automobile tires.

Curtis Tire Co., Inc., March 21 (New York), \$10,000. Harry E. Loveless, Harry Whittaker and Syd Elin—all of 354 Amsterdam avenue, New York City.

Errickson-Priddy Tire Co., February 12 (Oklahoma), \$12,000. C. A. Errickson, S. E. Priddy, J. S. Twombly and J. E. Errickson—all of Ardmore, Oklahoma. Principal office, Ardmore, Oklahoma. To deal in automobile accessories and to conduct an automobile repair shop, etc.

Insulation Development Corporation, March 14 (New York), \$5,000. Edward Rose, Eugene Lawler and Martin Dillon—all of 2 Broadway, New York City. Wire insulating, etc.

Kipp Inner Tube Repair, Inc., February 27 (New York), \$25,000. B. F. Klass, 523 West One Hundred and Fifty-second street; G. J. Heyson, 227 West One Hundred and Eighteenth street, and N. J. Jewel, 250 Manhattan avenue—all in New York City.

A. H. Langford, Inc., March 9 (New York), \$10,000. A. H. Langford, 8 Centre avenue, New Rochelle, New York. F. J. Farnell, Providence, Rhode Island, and B. C. Elliott, 1400 Broadway, New York City. Principal office, New Rochelle, New York. To manufacture rubber tires, etc.

Leader Tire & Rubber Co., Inc., February 27 (New York), \$5,000. Sydney Bernheim, 35 Nassau street, New York City; C. A. Weldon, 591 Seventh street, and H. H. Jacobson, 555 Grand street—both in Brooklyn, New York. Repairs, etc.

Life Preserver Suit Co., Inc., March 5 (New York), \$1,000,000. Louis S. Bruenn, 254 West Seventy-sixth street; Ladislaus Von Keviczky, 256 West Ninety-seventh street, and A. E. Puckrin, 175 Claremont avenue—all in New York City. To manufacture life-saving suits and apparatus.

Pacific Rubber Co., January 22 (California), \$50,000. John Hauerwaas, E. C. Austin, W. H. Preston, L. S. Rounsaville and Roy R. Meads—all of Los Angeles, California. Principal office, 433-5 West Pico street, Los Angeles, California. To deal in automobile tires and accessories.

Para Rubber Products Co., February 27 (New Jersey), \$30,000. Frederic W. Rogers and Edward C. Goldfarb, 40 Exchange Place, and H. H. Waller, 140 Nassau street—both in Manhattan Borough, New York City. Principal office, 70 Washington street, Bloomfield, New Jersey. To manufacture and deal in rubber goods.

Paraloid Works, Inc., March 22 (New York), \$80,000. Hugo L. Schneider, Hastings-on-Hudson, New York; Frederic C. Pitcher and Samuel L. Jackson—both of 111 Broadway, New York City. To manufacture rubber, etc.

Paramount Puncture-Proof Tire Co., Inc., March 6 (New York), \$100,000. H. Levy and M. P. Hartman, 37 Liberty street, and S. Kraft, 30 Church street, both in New York City.

Powhatan Metal, Iron and Rubber Co., Inc., March 8 (New York), \$1,000. Louis Milansky, Samuel Milansky and Philip Milansky—all of 199 East Third street, New York City. To deal in junk.

Quick Tire Service, Inc., March 19 (New York), \$10,000. Russell Goldman, 1190 Madison avenue; A. G. Thaanum, 112 Haven avenue—both in New York City, and A. Foshay, 49 Pulaski street, Brooklyn, New York. Tire repair and sales station.

Reliable Tire and Repair Co., The, March 1 (Ohio), \$15,000. F. A. Kline, G. F. Kline, Charles Selby, I. L. Holderman and Lester Selby—all of Dayton, Ohio. Principal office, 305 West Third street, Dayton, Ohio. Tires, tubes and accessories.

Ronback, Walter A., Co., Inc., March 15 (New York), \$5,000. P. W. Smith, 2103 Ocean avenue; Walter A. Ronback, 1657 East Eighth street—both of Brooklyn, New York, and Harry S. Jaeger, Patchogue, New York. To manufacture tires, autos, supplies, etc.

Rubber City Clearing House Co., The, February 7 (Ohio), \$100,000. A. H. Noah (president), C. E. Wilcox (vice-president), R. H. Noah (secretary and treasurer), and C. E. Williams (general manager). Principal office, 1033-1035 South High street, Akron, Ohio. To deal in tires.

Rubber Goods Manufacturing Co., February 10 (Illinois), \$50,000,000. E. S. Williams (president), 524 Fifth avenue; Samuel Norris (secretary), 45 East Sixty-first street, New York City. Principal office, 112 West Adams street, Chicago, Illinois. To deal in rubber products of all kinds.

Security Tube Co., of New Jersey, The, March 14 (New Jersey), \$50,000. James F. Lynch, Joseph Immerman and Eliot Norton—all of 2 Rector street, New York City. Principal office, 14 Chestnut street, Rutherford, New Jersey. To deal in automobile accessories, including tires and tubes of all kinds and description.

Smith, Howard B., Inc., March 19 (New York), \$50,000. J. A. Van Arsdale, 22 Soldiers Place; W. F. Hofheins, 585 Breckinridge street, and Allen Keeney, 33 Franklin street—all of Buffalo, New York. To deal in tires and rubber goods.

Temple Tire & Supply Co., Inc., February 14 (Pennsylvania), \$50,000. John H. Risbeck (president), James D. Pasho (vice-president), John H. Giles (secretary), C. L. Barnett (treasurer)—all of Pittsburgh, Pennsylvania. Principal office, 628 Penn avenue, Pittsburgh, Pennsylvania. To manufacture and deal in automobile tires, accessories, etc.

Vernon Tire & Rubber Co., Inc., The, March 12 (New York), \$25,000. Arthur M. Gross (secretary), 22 Wilson Place; Louis Silverstein, 18 Wilson Place, and Edward A. Partch, 515 South Seventh avenue—all of Mount Vernon, New York. Principal office, Ninth avenue and Sixth street, Mount Vernon, New York. To manufacture tires, rubber soles and heels, etc.

TRADE NOTES.

The Mansfield Tire & Rubber Co., Mansfield, Ohio, has raised its capital stock from \$200,000 common and \$100,000 preferred to \$800,000 common and \$450,000 preferred, of which all the common stock and \$200,000 of the preferred has been subscribed for and paid in, this additional capital providing for the increased demands for Mansfield tires.

A new concern in Fort Worth, Texas, is the Texas Tire & Rubber Co., formed for the purpose of doing a general automobile tire business. This company also operates a Goodyear service station. John Edward Gill is the manager.

The Cupples Co., formerly Samuel Cupples Woodenware Co., St. Louis, Missouri, is manufacturing a rubber tire with a rough safety tread of reversed and staggered C's; also the Rhinos patented inner tube which is made in fairly heavy thickness with fabric insert and is molded and cured in the exact size and exact form of the inside of the casing for which it is intended. This company produces about 400 tires and tubes a day and plans are now under way for doubling this production.

The Lee Tire & Rubber Corp., Conshohocken, Pennsylvania, is now making double the number of tires it turned out last year at this time. January's output was reported as 18,000 tires, February, 26,000, and in March the production was estimated to aggregate 30,000 tires.

The Triple Airless Tire Co., Butler, Pennsylvania, has increased its capital stock from \$50,000 to \$150,000, this increase to include the United States, France, Germany, Great Britain and Canada patents.

The Boone Tire & Rubber Co. is establishing a plant at Chipewewa Falls, Wisconsin, for the manufacture of approximately 200 casings and 200 tubes per day. Five 7-platen presses will also be installed for the manufacture of rubber soles and heels, together with a 5-ton capacity reclaiming plant. A portion of this equipment has already been ordered.

Attorney H. C. Koehler has been appointed receiver for the Alliance Rubber Co. and the Alliance Tire & Rubber Co., of Alliance, Ohio. The property will not be operated under the receivership, but will be appraised with the assets of the company, and as soon as an order of the court can be obtained the property and plant as a whole will be sold. The Alliance Rubber Co. was organized in March, 1913, and in 1916 a reincorporation was effected, with an increase in capital from \$58,000 to \$2,500,000, and the name changed to that of the Alliance Tire & Rubber Co.

The Peerless Tire & Rubber Co., Portland, Oregon, has been formed as a tire distributor and also maintains a well-equipped tire repair shop. Albert Courts is sole owner of the company.

The Marathon Tire Co. is owned by Clark C. Wortley, who is opening up a jobbing business in "Marathon" tires for the State of Iowa, with headquarters at Des Moines. Mr. Wortley expects shortly to open up branch retail stores in all the large cities in Iowa and will also sell to dealers.

The Reliable Tire & Repair Co., Dayton, Ohio, notice of whose incorporation appears elsewhere in this issue, will erect a new building in the automobile district of Dayton, 125 feet long, 39 feet wide and two stories high, with every facility for carrying on its business along the most modern lines. Fred A. Kline is secretary and general manager of the company.

The newly reorganized Dreadnaught Tire & Rubber Co., of Baltimore, Maryland, is making arrangements for a largely increased output of its tires and inner tubes, and has appointed Charles F. U. Kelly to take charge of the sale and distribution. H. Lawton Pettingell will be one of the heads of the sales organization, continuing his association with Mr. Kelly. The new organization is starting out on an aggressive policy. New ma-

chinery and equipment have been provided, capable of doubling the former capacity of the plant, and plans have been formulated for the erection of new buildings to take care of the anticipated increase of business. The headquarters of the sales department are 1834 Broadway, New York City.

The Racine Auto Tire Co., Racine, Wisconsin, which has a present output of 300 tires and 350 tubes per day, is now breaking ground for a new factory, the first unit of which will give a capacity of approximately 1,500 tires per day. The site of the new plant is the old Wisconsin-Illinois baseball park, consisting of approximately four acres, which will allow for expansion in output to 5,000 or 6,000 tires a day. The officers of this company are: L. J. Elliott, president; J. H. Wright, vice-president; C. H. Wright, secretary and treasurer.

The Fisk Rubber Co., Chicopee Falls, Massachusetts, has opened a new branch and service station at 154 Rayen avenue, Youngstown, Ohio, in charge of A. J. Sharpe.

The Ardmore-Akron Tire & Rubber Co. will be the name of a new rubber manufacturing enterprise to be located at Ardmore, Oklahoma. John C. Harmony will be president and Charles BeSaw, vice-president and general manager. It is reported that Ardmore has guaranteed a bonus of \$75,000 cash and donated a 5-acre tract of land for the erection of the plant. Mr. BeSaw is the president of the BeSaw Rubber Co., of Hartville, Ohio.

A company has been organized at Bangor, Michigan, for the manufacture of a variety of articles from marl, a substitute for hard rubber. The officers of the new company are L. P. Walker, president, and Edwin Hickey, secretary.

The Palmer Rubber Tire Co., St. Joseph, Michigan, is located in the remodeled quarters of the old Truscott Boot Co. The company is said to be backed by Chicago capital.

R. B. Pierce is the new Cleveland, Ohio, manager for the Kelly-Springfield Tire Co. He was formerly connected with the company's Cleveland branch, but has spent the past year at the plant in Akron.

J. E. Lemmon, who has been connected with the Falls Rubber Co., Cuyahoga Falls, Ohio, has recently been appointed manager of the company's branch at Cleveland, Ohio.

The capitalization of the Gordon Tire & Rubber Co., Canton, Ohio, has been increased from \$600,000 to \$1,600,000. The increase was authorized by the stockholders to take care of future expansion.

The Keystone Tire & Rubber Co., New York City, is moving into new quarters in the "Keystone Building," at Broadway and Sixty-second street.

The National Tire & Rubber Co., East Palestine, Ohio, recently purchased by a syndicate of local capitalists prominently identified with the local rubber industry, will be operated without change of name. Rapid expansion of the business is anticipated. The officers of the new corporation are: C. L. Merwin, president; S. L. Warner, vice-president and general manager; R. B. Taggart, treasurer, and E. N. Herrick, secretary.

THE GREAT REPUBLIC TIRE COMPANY.

The Great Republic Tire & Rubber Manufacturing Co., Wilmington, Delaware, notice of whose incorporation appeared in the February issue of THE INDIA RUBBER WORLD, will presently increase its capital to \$2,500,000, \$1,000,000 of 7 per cent preferred stock and an issue of common stock to be offered for sale. The factory location has not been definitely decided upon but will be in Oklahoma or Texas. J. M. Owens, president of the company, owns large rubber interests in Mexico; W. H. Owens, vice-president and general manager, is a thoroughly experienced tire man, and J. L. Walker, secretary and treasurer, is well known as a wholesale dealer in hardware, automobiles, tires and accessories.

H. L. McCLAREN.

H. L. McCLAREN, who has recently been elected vice-president and sales manager of the Ajax Rubber Co., Inc., New York City, is a veteran in the tire business, his record

dating back to the days of Morgan & Wright, with whom he advanced to the position of sales manager for the Middle West, continuing in the same capacity with the United States Tire Co., which absorbed the business of that concern. In 1912 he became vice-president and general manager of the Racine Rubber Co., Racine, Wisconsin, and later, its president. His achievements with that firm induced the financial interests back of the Mitchell-



H. L. McCLAREN.

Lewis Motor Co., Racine, Wisconsin, to elect him president, and in this dual capacity he put the motor company on its feet and sextupled the business of the tire company.

The Ajax Rubber Co., Inc., recently purchased the business of the Racine Rubber Co., and now the products of both companies will be marketed separately under Mr. McLaren's direction. He has resigned his position with the Mitchell-Lewis Motor Co. and will devote his entire energies to the tire business, in which line his record has been a continuous and striking success.

THE FISK RUBBER CO. REPORT.

At the recent annual meeting of The Fisk Rubber Co., Chicopee Falls, Massachusetts, the following officers and directors were elected, all being reelected except J. D. Anderson, who is a new addition to the board of directors: H. T. Dunn, president; H. G. Fisk, treasurer and clerk; E. H. Broadwell, G. A. Ludington, vice-presidents; R. B. McGaw, assistant treasurer; E. M. Bogardus, comptroller. Directors: H. T. Dunn, Toledo, Ohio; E. H. Broadwell, Longmeadow, Massachusetts; Stedman Buttrick, Boston, Massachusetts; J. D. Anderson, H. G. Fisk, G. A. Ludington, Fred T. Lev—all of Springfield, Massachusetts.

Following is the company's profit and loss report and statement of assets and liabilities for the fiscal year ending December 31, 1916. The total sales for the fiscal year were given as \$19,457,788.77.

ASSETS	
Factory equipment, branch furniture and fixtures at depreciation.....	1,890,067.41
Investments.....	1,875,442.37
Patents.....	57,307.79
Prepaid expenses.....	4,343.26
Total Assets	\$4,827,160.83

CURRENT ASSETS

Inventories, raw materials and supplies, work in process and finished product.....	\$7,476,203.58
Tires in use under mileage contracts.....	38,201.87
Notes and accounts receivable, less reserve for doubtful debts and cash discounts.....	3,893,695.64
Collateral notes from employees.....	
Notes receivable for special deposits.....	
Cash on hand.....	13,556,465
Prepaid rents, royalties, taxes, interest and insurance.....	
Stationery and office supplies.....	88,618.25
Other prepaid expenses.....	21,837.48
Total Current Assets	\$27,796,753.52

LIABILITIES

CAPITAL STOCK AND RESERVE	
First preferred non-convertible.....	\$4,400,000.00
First preferred convertible.....	5,000,000.00
Second preferred convertible.....	4,500,000.00
Common.....	8,000,000.00
Total Capital Stock	\$21,900,000.00
CURRENT LIABILITIES	
Loans payable.....	2,150,000.00
Accounts payable.....	682,293.58
Accrued income tax and wages.....	37,764.23
Dividends due, not paid.....	4,485.25
Total Current Liabilities	2,874,543.06
RESERVE ACCOUNTS	
SURPLUS appropriated for retirement first preferred stock....	171,768.09
SURPLUS per attached statement.....	975,000.00
Total Reserves	1,875,442.37
Total Liabilities	\$27,796,753.52

PROFIT AND LOSS AND SURPLUS.

SURPLUS, balance December 31, 1915.....	\$1,246,394.28
Add:	
Net profits for the year ending December 31, 1916, after deducting manufacturing costs, depreciation and interest on borrowed money.....	\$1,836,829.86
Less unusual expenses absorbed.....	95,125.08
Total Additions	1,741,704.78
Total Surplus	\$2,988,099.06
DEBIT	
Dividends paid, on first preferred stock.....	\$308,000.00
On second preferred.....	140,000.00
Total Dividends	\$448,000.00
SURPLUS appropriated for retirement of first preferred stock.....	\$375,000.00
Premium paid on 3,750 shares first preferred stock retired.....	7,940.58
Fees and expenses in connection with increase of capital stock.....	16,866.11
Commissions paid on sale of 50,000 shares first preferred convertible stock and 5000 shares of second preferred stock.....	275,000.00
Total Debits	\$1,112,806.69
Less miscellaneous stock profits.....	10,150.00
Total Debits	\$1,122,956.69
Total Surplus	\$1,875,442.37

J. & D. TIRE & RUBBER CO.

At the annual meeting of the J. & D. Tire & Rubber Co., Charlotte, North Carolina, held March 1, the following officers were reelected: H. O. Smith, president; Thos. J. Northway, vice-president; C. C. Coddington, treasurer, and Lee A. Folger, secretary. These, together with H. S. Leyman, W. G. Welbon, John L. Dabbs, and E. Thomson, constitute the board of directors.

The company's new plant just completed consists of three buildings of concrete and glass construction, two main buildings, with the mill room in a one-story structure in the center. The arrangement is such that additional buildings and equipment may be developed up to a capacity of 2,000 tires per day without any rearrangement of the present plant. The machinery is electrically driven, the vast hydro-electric power sources of that section making electric power inexpensive. Boilers of 250-horse-power are used for heating and vulcanizing. The machinery is new and modern in every particular, and the company expects to develop a very large business under the management of the officers and superintendent, several of whom have had long practical experience in the tire business.

Annual Report of the United States Rubber Co.

THE annual report of President Samuel P. Colt, of the United States Rubber Co., which was sent to the stockholders early last month, is even better than the preliminary report furnished earlier, at the time of the \$60,000,000 bond financing.

The net sales of \$126,759,129 are \$1,759,000 larger than the preliminary estimates, and the balance of net profits for interest on funded debt of \$13,495,155 is practically \$1,000,000 better than the preliminary estimate of a balance of at least \$12,500,000.

As a matter of fact, net sales for 1916 gained \$33,898,113, or 36.5 per cent, over the previous year. The balance for interest (including floating debt) and dividends of \$14,743,774 was \$3,257,070, or 28 per cent, in excess of the corresponding figures for 1915.

It will be noted that while the sales and profits were both greater than in any previous year the percentage of profits to sales was less than in the previous year, and, therefore, the changes in prices inaugurated early this year were justified.

With the simplification of organization will come economies in administration, and the funding of indebtedness will further reduce actual running expenses. Already the company has begun the liquidation of subsidiary companies through absorption by the parent organization.

The increase in the tire business is worthy of special mention, being nearly 60 per cent larger than that of 1915.

Evidently the Sumatra plantations are proving a valuable asset of the company. The expert business shows a gain, but only a small one.

The reports of the president and the treasurer follow:

THE PRESIDENT'S REPORT.

To the Stockholders of the United States Rubber Co.:

The by-laws of the company provide that the president "shall make a report in writing to the stockholders at their annual meeting, reviewing the general business and condition of the company." In compliance therewith, your president submits the following report for the fiscal year ending December 31, 1916.

The treasurer's report, which is hereto appended and made part hereof, gives the consolidated general balance sheet as of December 31, 1916, and the consolidated income statement for the year ended December 31, 1916, of the United States Rubber Co. and all its subsidiary companies.

FUNDING OF COMPANY'S INDEBTEDNESS

The most important event of the year has been the funding of the indebtedness of the company and its subsidiaries through the banking house of Messrs. Kuhn, Loeb & Co. Negotiations to this end were begun some months ago and but recently consummated. Through the sale of \$60,000,000 first and refunding mortgage 5 per cent bonds, the company is now provided with funds wherewith to pay its entire debt and the debts of its subsidiary companies, with the exception of \$9,000,000 General Rubber Co. debentures due December 1, 1918, and \$2,600,000 Canadian company bonds due October 1, 1946. In addition to the payment of the indebtedness, further working capital is also provided. The bonds of the Canadian company are not being retired at present through the refunding, inasmuch as they do not mature for nearly 30 years; and the debentures of the General Rubber Co. are also left undisturbed for the present, as the company has under consideration other plans for dealing with its important crude rubber interests. Provision, however, is made for the issue of additional bonds up to the amount of the capital stock of the company at any time outstanding (at the time of the authorization \$97,252,900) to take care of the above named bonded obligations, should it hereafter be found desirable to do so; and, under conservative restrictions, to provide also for the future growth of the company.

This funding has been carried out in a most thorough manner; and, while the bankers have been exacting in their requirements where the security of the bond was involved, they have at the same time shown a breadth and a spirit of fairness in the

whole transaction and a desire to have the company unhampered in the economic administration of its business, which cannot be too strongly commended.

To authorize the transaction, our stockholders responded to the call for proxies with a unanimity most gratifying to your directors and president, and which I wish to take this opportunity to acknowledge. More than three-quarters of each class of stock (the percentage of the whole being over 82 per cent) voted in favor of the transaction and no shares voted against it.

SIMPLIFYING OUR ORGANIZATION.

With the funding of our debt, we will be able to simplify our organization and thereby bring about economies in administration in several ways, among which will be the liquidation of companies whose separate organization is now unnecessary. Steps to this end will be promptly taken.

VOLUME OF BUSINESS.

The net sales of the company for the year 1916 were \$126,759,000, as against \$92,861,000 the previous year, an increase of \$33,898,000 or about 36 per cent.

PROFITS AND DIVIDENDS.

The net profits of the business for the year 1916, before deducting interest charges, amounted to \$14,743,000; after deducting interest charges the profits were \$11,226,000. These profits cover the dividends upon the preferred stocks, and enhance the intrinsic value of the common stock.

MAINTENANCE.

The custom of maintaining the fixed properties of the company in the highest state of efficiency and charging the cost of such maintenance to expense account has been again followed during the past year. Our plants are all in first-class, up-to-date condition and are now being run to full capacity.

BASIS OF INVENTORIES.

Following our usual practice, inventories of manufactured goods and materials have been taken at cost where cost was below market, and at market where market was below cost. Market to-day is generally above cost.

UNITED STATES RUBBER EXPORT CO., LIMITED.

Our export business, now consolidated under one organization, the United States Rubber Export Co., Limited, is being successfully pushed forward, although it is still relatively small, being only about 6½ per cent of our total business in 1916 as against 5 per cent in 1915.

UNITED STATES TIRE CO.

Our new "Royal Cord" tire and the new non-skid "Usco" tire have given us the most complete line of tires manufactured by any company. There is still a wide and increasing demand for the "Nobby Tread" and "Chain Tread," which are acknowledged to be the best non-skid tires in the market. Our tire sales for 1916 show an increase of 57.9 per cent over those of 1915.

OUR SUMATRA RUBBER PLANTATIONS.

The development of our rubber plantations in Sumatra has steadily continued during the past year. The amount of crude rubber received therefrom in 1916 was substantial and was largely in excess of previously estimated production. The future increase in production will be rapid, as the great number of young trees are more and more coming into bearing. Our most sanguine expectations from these estates are being realized and it is believed that they will prove to be one of the most valuable assets of the company.

ADVANCE IN PRICES AND OUTLOOK.

While the profits of the company for 1916 were the largest in its history, the percentage of profits to sales was less than in the previous year, owing chiefly to the advance in materials and labor during the year. With the view of meeting these conditions an advance in prices of manufactured goods, varying from 10 to 20 per cent was made early this year.

The increase in net sales of the company for the first two months of the present year over the corresponding months of last year exceeds 20 per cent.

CONCLUSION.

Rubber Co. commenced business. In that time it has steadily grown. In the last 15 years its business has increased five fold—thanks to the devotion of its working force.

The future of the company is bright, due to the continued fidelity and ability shown by the officers, heads of departments, those in charge of our Far Eastern plantations and the other employees of the company and its subsidiaries.

THE TREASURER'S REPORT

UNITED STATES RUBBER CO.
SOUTH BRUNSWICK, N. J.

ASSETS.

Capital stock, second preferred.....	403,600.00
Capital stock, common.....	36,000,000.00
Total Assets	\$222,366,569.45

LIABILITIES.

Capital stock, second preferred.....	403,600.00
Capital stock, common.....	36,000,000.00
Total Assets	\$222,366,569.45
Owned by United States Rubber Co., de.....	9,402,800.00
Minority Canadian Consolidated Rubber Co., Limited, stock, preferred \$283,625; common \$101,455.....	385,080.00
General Rubber Co. 5 per cent debentures.....	16,000,000.00
Forty-year 6 per cent collateral trust gold bonds, Canadian Consolidated Rubber Co., Limited.....	2,600,000.00
Canadian Consolidated Rubber Co., Limited.....	5,000,000.00
Morgan & Wright 5 per cent debentures.....	737,000.00
Mechanical Rubber Co., and New York Pelting and Packing Co., bonds.....	20,807,000.00
Reserve for depreciation.....	5,000,000.00
Fixed surpluses (subsidiary companies).....	15,080,230.78
Total Liabilities	\$222,366,569.45

ANNUAL ELECTION

BOARD OF DIRECTORS FOR 1917

The annual meeting of the stockholders of the company was held at New Brunswick, New Jersey, March 20, and the following directors were elected:

James S. Alexander, New York City.
Walter S. Ballou, Providence, Rhode Island.
James C. Brady, New York City.
Nicholas F. Brady, New York City.
Middleton S. Burrill, New York City.
Samuel P. Colt, Providence, Rhode Island.
Harry E. Converse, Boston, Massachusetts.
Edgar B. Davis, Brockton, Massachusetts.
James Deshler, New Brunswick, New Jersey.
James B. Ford, New York City.
Francis L. Hine, New York City.
Henry L. Hotchkiss, New Haven, Connecticut.
William S. Kies, New York City.
Lester Leland, Boston, Mass.
Samuel M. Nicholson, Providence, Rhode Island.
Raymond B. Price, New York City.
Homer E. Sawyer, New York City.
Charles B. Seger, New York City.
William H. Truesdale, Greenwich, Connecticut.

Theodore N. Vail, Boston, Massachusetts.
Elisha S. Williams, New York City.

This list consists of the old board with three additions, namely, James S. Alexander, president of the National Bank of Commerce, New York City; William S. Kies, vice-president of the American International Corporation, New York City; and Charles B. Seger, vice-president and comptroller of the Union Pacific system, New York City. These gentlemen are practically those interested in the Kuhn-Loeb banking group which has purchased the recent new \$60,000,000 bond issue. These three men bring a new element into the board of directors and will emphasize the undoubtedly valuable banking connection which the corporation has recently effected.

ELECTION OF OFFICERS.

The board of directors of the United States Rubber Co., elected at the annual meeting of stockholders, met at the office of the company, 1790 Broadway, New York City, March 22, and organized by the election of the following officers for the ensuing year:

Samuel P. Colt, president; James B. Ford and Lester Leland, vice-presidents; Raymond B. Price, vice-president in charge of development department; Homer E. Sawyer, vice-president in charge of footwear department; Elisha S. Williams, vice-president in charge of mechanical departments; Samuel Norris, secretary; John D. Carberry, assistant secretary; W. G. Parsons, treasurer; E. J. Hathorne, assistant treasurer.

PRESIDENT COLT ENTERTAINS.

On Wednesday evening, March 21, Colonel Samuel P. Colt, president of the United States Rubber Co., tendered a dinner at the Metropolitan Club, New York City, to the directors and operating staff of the company and several New York bankers and personal friends, the main object being to introduce to the heads of departments and operating staff the three newly elected directors, Messrs. Alexander, Kies and Seger.

The dining room was handsomely decorated, and a novelty was that all these decorations were of rubber in its various forms and colors, and the boutonnières, which were artificial flowers in natural colors, were also made of rubber. There were about 60 guests. Speeches were made by Otto H. Kahn, Homer E. Sawyer, William S. Kies, Senator Le Baron B. Colt, Edgar B. Davis, Francis Lynde Stetson, Mortimer L. Schiff, Victor E. Mitchell, K. C., and Dr. Ernest M. Stires. The menus were decorated with photographs of the company's plantations in Sumatra, each menu having a different picture. During the banquet Naham Franko's orchestra furnished a very artistic musical program.

DIRECTORS OF LUMBER COMPANIES TO INSPECT PROPERTIES.

A party consisting of directors and guests of the Atlantic Coast Lumber Corporation and United Timber Corporation, including Colonel Samuel P. Colt, United States Senator Le Baron B. Colt, of Rhode Island; James B. Ford, John D. Carberry, W. G. Parsons, J. N. Gunn, J. Cunliffe Bullock, Walter S. Ballou, Nathaniel Myers, Charles A. Emerson, Henry L. Hotchkiss and H. E. Robinson, left New York City March 23 for Georgetown, South Carolina, on a five-day tour of inspection of the various properties in South Carolina in which they are interested.

RUTHERFORD RUBBER CO. CHANGES.

Recent changes in the Rutherford Rubber Co., Rutherford, New Jersey, forces include the appointment of J. J. White, former manager of the New Haven, Connecticut, branch, as manager of the branch at Cleveland, Ohio; Charles Schoneman, former manager, first of the Hackensack, New Jersey, and then of the Baltimore, Maryland, branch, as division manager; C. A. Reynolds, in charge of all New England branches, and James O'Hea, manager of the new Pittsburgh, Pennsylvania, branch.

Only 16 years ago the Firestone Tire & Rubber Co. was established for the manufacture of carriage tires on a small scale, and

...the remainder subsequently realized)

LIABILITIES.	
Preferred, 6 per cent., cumulative capital stock subscriptions..	\$5,000,000.00
Common capital stock.....	600,000.00
Notes payable	5,245,843.76
Accounts payable	1,277,365.48
Accounts receivable	80,881.96
Sundry creditors, accrued salaries, wages, taxes, interest,	
Wages	1,000,000.00
Interest	50,417.98
Surplus	8,000,000.00
	\$34,360,848.56

The stock distribution plan of the Firestone Tire & Rubber Co., previously mentioned, has received remarkable support, 90 per cent of the total force, or over 11,000 Firestone employees, taking advantage of the company's offer to make them shareholders. Rarely, if ever, have employees had the same occasion for feeling their responsibility in so large a business because of their own personal interest and the future interest of their families. They have acquired stock which at time of purchase is quoted at nearly half again what they will pay for it. They have this stock in a company capitalized at \$15,000,000, the certified assets of which run over \$34,000,000, the surplus already listed being \$18,000,000. All of which means that they will profit not only through their work in the future and the company's further growth, but that they profit through their good work in the past.

While the step taken by this important company is of no small significance to the business world in general, it is only the latest achievement in a long program of cooperative measures which form a part of the broad-minded and far-sighted plans of the president, H. S. Firestone, including the \$350,000 Firestone Club House opened last year; also "Firestone" Park, with its beautifully situated home building plat; the establishment of the Rubber City Savings Bank near the Firestone factories, and the setting aside of a \$1,000,000 fund for benefits to employees, such as insurance, pensions and the like.

East Akron, the home of the American Hard Rubber Co.'s factory and that of the Mohawk Rubber Co., the General Tire & Rubber Co. and the Goodyear Tire & Rubber Co. is several miles from the banking center of the city. In order to encourage habits of saving among the factory employees and as a convenience to the manufacturers in this section, The Ohio Savings & Trust Co. has been formed, with officers as follows: President, F. A. Seiberling, president of the Goodyear Tire & Rubber Co.; vice-president, C. W. McLaughlin, vice-president of the Mohawk Rubber Co.; treasurer, W. E. Palmer, assistant treasurer of the Goodyear company; secretary, C. F. Ayers.

In order to secure cash to take care of increased business,

the Goodyear Tire & Rubber Co. will issue a total of \$9,370,000 in stock, of which \$6,000,000 will be preferred and \$3,370,000 common. The preferred stock has been disposed of to bankers, and the common will be offered to stockholders in the ratio of 20 per cent of their holdings. The company is capitalized at \$50,000,000, half preferred and half common, of which only \$17,500,000 of each has been issued. The new financing will bring the total issues to \$23,500,000 preferred and \$20,870,000 common.

* * *

At the last annual meeting of the stockholders of the Miller Rubber Co., Akron, Ohio, the officers of the company were authorized to turn over to the United States Government the benefit of its organization and equipment in any needed capacity, and hearty coöperation and support were pledged in any emergency that may arise.

* * *

The Amazon Rubber Co. is offering to the public, at par, \$100 per share, a new issue of stock consisting of \$400,000 of common and \$100,000 of 7 per cent preferred. This company is rapidly securing national distribution for its product—a standard tire with extra breaker strips on the sides and an extra heavy brown tube.

F. C. Burt, an Akron tire man, has recently joined the sales force of the Amazon company.

* * *

D. A. Murray is now connected with the sales department of The American Rubber & Tire Co. as district agent, with supervision of sales in the Central district.

Fred Kemple, formerly manager of the pneumatic tire department of the above company, has been promoted to the position of factory superintendent.

* * *

Harry E. Boyd, assistant superintendent of The Adamson Machine Co., died on March 12 of pneumonia, after a few days' illness. Mr. Boyd had been connected with the Adamson company for five years and was considered one of its most capable and promising men. His loss is deeply regretted by the firm as well as by his personal friends.

THE RUBBER TRADE IN BOSTON.

Our Regular Correspondent

THE automobile show in Boston, last month, was in many respects the best attended and most productive of business of any ever held here. Not only were more automobiles sold, but these sales individually averaged higher prices than those of former years. This, in itself, is an indication of the general prosperity of New England and its leading city.

Not only in pleasure cars but in those intended solely for transporting goods, the demand was unprecedented. To-day there are a hundred business houses interested in motor trucks where there was one five years ago. Much of the suburban haulage of heavy as well as light merchandise is by these vehicles, while there is a steadily increasing amount of stock and manufactured goods being transported over the road, which formerly was carried by freight over the railroads. Every year this motor-truck business is extending further and further in point of distance, and naturally has had its effect in bringing business to the motor-truck exhibitors at this auto show.

Over 500 cars and trucks were shown, together with 170 accessory exhibits. The Mechanics Building did not provide enough space, although the basement, Grand Hall, and its gallery, the Exhibition Hall (two floors) and Paul Revere Hall were brought into requisition, and so Horticultural Hall, four blocks west, and the ballroom of the Copley-Plaza Hotel, two blocks north, were used for the overflow. The rubber trade was only meagerly represented, and, as in previous years, there were but

few tire exhibits. Perhaps the best of these was that of the United States Rubber Co., of New York City.

* * *

The B. F. Goodrich Co. chose auto-show week to place in its big Boylston street window two of its Silvertown cord tire machines, perhaps as intricate and ingenious pieces of mechanism as any used in the tire industry. As a consequence, the sidewalk in front was one of the most crowded areas of its size in the city, and many of the spectators, of a more mechanical turn of mind, invaded the window itself for a closer inspection of the working of these \$20,000 machines, which lay the flattened cords smoothly and evenly over the surface of the carcass, these to be imbedded with rubber and vulcanized. Expert mechanics from Akron were in charge of these automatic machines, which place two layers of cord about the tire in such manner that every inch of cord is under uniform tension. Although the double operation takes about 20 minutes, there were many spectators who watched the entire operation from beginning to end.

The writer wishes to rectify an error which appeared in the March letter relative to the Plymouth Rubber Co. factory. It was spoken of as being located in Stoughton, Massachusetts, instead of Canton, this state, the concern having removed from Stoughton six years ago. Because, for years before, the writer had always connected this company's name with the town of Stoughton, the error inadvertently slipped in. The new factory building, recently completed, puts Canton the more prominently on the map, and locates it definitely in the minds of all passengers between Boston and New York by way of Providence.

The Revere Rubber Co. plant of the United States Rubber Co., at Chelsea, has decided to discontinue its electric plant and will rely for lighting and motive power on the Edison company's service, a long-term contract for such service having been entered into within the last month. It is estimated that this will amount to about 5,000 horse power. The steam service, of course, will be continued for heating and vulcanizing purposes. The company's shoe and sole business, which is only a portion of its output, is growing by leaps and bounds, and its specialties in several other lines are in heavy demand at present.

* * *

Mr. and Mrs. Franklin W. Pitcher celebrated the fiftieth anniversary of their marriage at their home in Easthampton, Massachusetts, on Tuesday, March 13. More than 200 guests attended, among them many intimate friends connected with the rubber and textile industries.

Mr. Pitcher, who is treasurer and general manager of the Easthampton Rubber Thread Co., became interested in the elastic fabric business many years ago, and this led him to join in the organizing of the Revere Rubber Co., Chelsea, Massachusetts. He was the first treasurer of that company and afterwards its president. In 1885 he moved to Easthampton to be in close touch with the Easthampton Rubber Thread Co., and with the exception of a few years has ever since resided there, where he has become identified with several of the financial and manufacturing interests of that town. Both Mr. and Mrs. Pitcher are natives of Maine and were married at Pittston, that state, March 13, 1867. They have two sons and a daughter. One son, William L. Pitcher, is superintendent of the Easthampton Rubber Thread Co.'s factory, and the other, Walter F. Pitcher, is treasurer and general manager of the Franklin Steel Works.

* * *

The Boston Woven Hose & Rubber Co. did a very prosperous business last year, its sales exceeding \$6,000,000, and it is expected that for the present year it will reach the \$7,000,000 mark in output. Last year its net earnings are reported to have been

nearly 40 per cent on its \$2,000,000 common stock after paying the preferred dividends. The sum of \$322,710 was spent out of earnings on new buildings and equipment and \$750,000 transferred from the surplus to capital account. Extra cash dividends have been paid in 1912, 1914 and 1915, to a total of 110 per cent, besides the annual dividends, and the rights to purchase the new issue of \$1,000,000 common stock are held at a substantial premium.

* * *

President George B. Dryden and Vice-President George C. Reeves, of the Dryden Rubber Co., Chicago, Illinois, were in Boston several days the middle of the month, making their headquarters at the Boston office, which is in charge of J. A. Ford. This company, which makes a large variety of molded goods, is finding a heavy increase in the demand for its fiber soles and rubber heels, which are being used extensively by shoe manufacturers.

* * *

The award of contracts for 16 dirigibles by the United States Government will doubtless result in at least a share of the business coming indirectly to the American Rubber Co. factory of the United States Rubber Co. at Cambridge. This factory has made a special study of balloon fabrics, its line of this material having been used for the United States Navy balloons ordered of the Connecticut Aircraft Co., one of the concerns which has secured a share of the new contract.

THE RUBBER TRADE IN RHODE ISLAND.

By Our Regular Correspondent

THE demand for rubber goods of every description continues on the same record breaking plane that has characterized the industry for more than two years, and it is uncertain when there will be any appreciable diminution. While the European War with its enormous demands, unquestionably has a most substantial effect on the unprecedented activity of the rubber factories, there is no denial of the fact that the normal demand for ordinary production is increasing at a rate seldom, if ever, equaled in any other industry. This is especially true as regards the manufacture of automobile tires and other accessories.

All the factories in Rhode Island are still being driven to capacity, notwithstanding which the accession of orders exceeds the output and has done so for months. From every plant comes a similar complaint that more operatives could be utilized to good advantage, but that it is impossible to obtain additional help. The scarcity of help is all that deters, in several instances, the extension of plants by the erection of new buildings or the construction of material additions to the present buildings.

Deeds and mortgages involving all the rubber manufacturing plants in Rhode Island that are subsidiaries of the United States Rubber Co., were placed on file in this city, Woonsocket and Bristol, on March 7, transferring to the parent corporation all the holdings in this State and elsewhere. The mortgage, which covered over 230 typewritten pages and is for \$97,252,900, covers not only the properties in Rhode Island, but in six other States—New York, New Jersey, Massachusetts, Connecticut, Indiana and Michigan—and is given to the Central Trust Co. of New York, to secure the principal and interest on the recent issue.

The Rubber Goods Manufacturing Co., a corporation controlled by the United States Rubber Co., also placed on record a mortgage to the Central Trust Co. of New York, as trustees, covering properties in several States, to secure gold bonds aggregating \$27,293,100.

Previous to the filing of the mortgages here and elsewhere, deeds were placed on record conveying all the property in Providence, Woonsocket and Bristol as well as in Millville, New

United States Rubber Co. the plants of the Revere Rubber Co., the Joseph Banigan Rubber Co., the Woonsocket Rubber Co., the National India Rubber Co., the Lawrence Felting Co., all subsidiaries of the parent company, and the plant of the Mechanical Fabric Co. was conveyed to the Rubber Goods Manufacturing Co.

* * *

A new motor ambulance has been purchased by a committee of overseers and others at the factory of the National India Rubber Co., at Bristol, as a memorial to the late Le Baron C. Colt, former vice-president and manager of that corporation and a nephew of Col. Samuel P. Colt, president of the United States Rubber Co.

The ambulance is to be used in conveying the sick and injured to hospitals or to their homes. It will be housed at the garage of the factory of the National Co., on Wood street, and will be free of charge to all who desire its services. It was purchased from a fund raised by the foremen, office help and others at the National Rubber Co., and by relatives and friends of the late Mr. Colt, outside of the factory.

* * *

The late Robert J. Bowes, of Millville, Massachusetts, for many years manager of the Lawrence Felting Co., and son of the late William J. Bowes, who founded the concern, left an estate of \$108,019.25 in personal property and \$5,450 in real estate.

* * *

Some of the departments of the Lawrence Felting Co.'s plant, at Millville, were unable to operate for several days the early part of the past month owing to the high water in the Blackstone river, which was caused by the bursting of a dam at Uxbridge. The river, on March 1, reached a point more than 20 inches above its ordinary level.

The Fisk Rubber Co., of New York, has given up its branch store at 17 Dorrance street and concentrated its local business at 134 Fountain street, Providence.

The Central Automobile Tire Co., of 111-119 Stanford street, Boston, has opened a branch at 15-17 Dorrance street, Providence.

H. T. Mason, of Boston, manager of the sole and heel department for New England of the Goodyear Tire & Rubber Co., was the principal speaker at the annual meeting of the Rhode Island Shoe Retailers Association on March 6. He spoke at considerable length in a description of "Neolin" soles.

The Anchor Webbing Co. has had plans drawn for a one-story office building, 50 by 60 feet, and a one-story and basement weave shed, 40 by 120 feet, in addition to its plant on Brook street, Pawtucket. The company has recently increased its capital stock from \$60,000 to \$150,000, according to its statement filed at the office of the Secretary of State.

* * *

By an act of the Rhode Island General Assembly, the corporate name of the Phillips Insulated Wire Co. has been changed to Phillips Wire Co., without any change in capitalization.

Terrence McCarthy, president of the Narragansett Rubber Co., Bristol, was removed to St. Joseph's Hospital, Providence, on March 13, to undergo medical treatment. He has been ill since about the first of last December and after a series of X-Ray pictures had been taken it was decided to remove him to the hospital. He is reported as improving.

* * *

I. Victor Stone, chief chemist of the Revere Rubber Co.'s plant, Valley street, Providence, gave an interesting address on the manufacture of rubber, illustrated by stereopticon views, before the Brotherhood of the Elmwood Christian Church recently.

THE RUBBER TRADE IN TRENTON.

By Frank A. Johnson, Editor.

THE death of Ferdinand W. Roebbling, Sr., secretary-treasurer and general manager of the great wire mills of the John A. Roebbling's Sons Co., occurred March 16. Business throughout Trenton was practically at a standstill while the funeral services were being conducted.

* * *

John A. Lambert, treasurer and general manager of the Acme Rubber Co., gave an interesting talk on the subject of rubber to the members of the Trenton Rotary Club at a recent meeting of the organization.

* * *

Joseph B. Linerd has been made a member of the board of directors and appointed general manager of the Globe Rubber Tire Manufacturing Co., Trenton, New Jersey, with an executive office at 1853 Broadway, New York City.



J. B. LINERD.

Mr. Linerd is a man of ripe experience in the tire industry. After four years with the Goodyear Tire & Rubber Co., Akron, Ohio, he became associated with the Ajax Rubber Co., Inc., New York City, of which company he was shortly afterwards appointed sales manager.

It is stated that the appointment of Mr. Linerd is the first step in an intensive, nation-wide sales campaign which will be conducted from the new executive office at the above mentioned location.

The Globe company has been manufacturing hand-made automobile tires for four years, and last year it was found necessary to double its capacity. These increased facilities give it a capacity of 1,000 tires per day, with a present demand sufficient to market this output.

* * *

The private mark of an automobile tire dealer in this city enabled the police of Bridgeport, Connecticut, to trace the owner of an automobile which had been stolen here. The car was found abandoned in Bridgeport, with every mark which might lead to identification apparently removed. The police in their efforts to trace ownership took off the tires and discovered a marking by which a Trenton tire dealer was able to tell to whom he had sold the tires.

* * *

The Court of Errors has rendered an opinion upholding a decree of Chancellor Backes in which he ruled that Isaac Fineberg must pay to Harry Freedman the sum of \$12,197 in settling up a partnership in a rubber reclaiming business in which they were engaged in this city.

* * *

The Crescent Insulated Wire & Cable Co. has filed with the Secretary of State, a certificate increasing its capital stock from \$250,000 to \$1,000,000. General C. Edward Murray is president.

RUBBER ASSOCIATION OF AMERICA MEETINGS.

At the meeting of the Arbitration Committee held in the Association rooms, March 15, W. F. Bass and M. L. Cramer were elected to serve for one year; Horace De Lisser and A. H. Brown, two years; W. E. Bruyn and R. B. Woodbury, three years, and W. G. Ryckman, chairman, three years.

The Executive Committee of the Rubber Reclaimers' Division met on March 29 and prepared a circular on "Standards of Rubber Scrap Specifications and Packing," to be submitted to the meeting of the entire division on April 11.

The Rubber Sundries Manufacturers' Division met March 30 to decide on the "Open Price Exchange" matter.

The Rubber Trade in Great Britain.

By Our Regular Correspondent.

DURING last November a prominent waterproofer told me he could book orders for 100,000 waterproof garments, but that it would be utterly impossible to turn out the goods as the whole capacity of his factory was required for government work. Since that time we have had an almost uninterrupted spell of wintry weather, our coldest time for 35 years. It is not surprising, therefore, that the home demand for waterproof goods has slackened off considerably. On one or two occasions there has been a run on goloshes, which are by no means superabundant, and it is noticeable that two or three firms are now repairing old and leaky ones, a thing one was told a few years ago could not be done. It is remarkable how the official pronouncement to save money by wearing your old things has been carried into practice, all sorts of commodities being either utilized in their worn state or made presentable by some process of renovation. Mention may be made of the use of old bicycle tires by the cobbler for patching boots. This mention of tires leads me to remark that the decrease in the output of tires for private motor cars, owing to the available hands being wanted for government work, has now been followed by severe restrictions on private motoring, so that the lack of tires will hardly be felt.

RUBBER BUSINESS SCENE

Although raw rubber remains at about pre-war prices in contradistinction to most other commodities, the immediate future at the time of writing is full of uncertainty, owing to prospective developments in the international situation. As regards the rubber business generally, there is a decided slackness, owing to many large government orders having been worked off and home demand for private consumers being decidedly small. The high price of cotton has proved a setback to the staple Lancashire industry, which is in a very unsettled state. It is announced that the imports of many classes of goods, especially of the luxury type, are to be strictly curtailed. Whether American rubber sponges sold at 6d. each, and Japanese air-cushions at 1s. 6d., will be considered as luxuries I do not know, but it is certain that their classification as such would not be objected to by home manufacturers, who have watched their advent and sustained popularity with some concern.

EMBARGO LIST ADDITIONS

The extension of the embargo list of May 10, 1916, affects among other exports those of goods made wholly or partly of rubber, gutta percha or balata, which can now be exported only to British possessions and protectorates, all other destinations being prohibited. This, of course, takes them out of a previous class, where they were prohibited being exported to any and all destinations.

ACCELERATORS.

Before the Manchester Section of the Society of Chemical Industry on February 2, S. J. Peachy, of the local school of technology, read a paper on this subject, dealing mainly with para-nitrosodimethyl aniline, patented by the author, and now on the market under the name of accelerine. The facts presented regarding accelerine were much the same as in the review of the organic accelerators in the January 1, 1917, issue of THE INDIA RUBBER WORLD. It was emphasized that the accelerative effect of aniline is extremely small, though methyl aniline is decidedly better. In order to produce a non-blooming rubber with accelerine there can be no saving of time, the ordinary length of cure, as with sulphur alone being necessary. Accelerine is sold in bulk with 30 per cent of

water, which must be removed before use. The substance shows a tendency to cake on the back roll of the mixer, and it is desirable to mix 20 per cent of Kisselgahr with it to overcome this.

An interesting discussion followed the reading of the paper. In reply to some remarks by Mr. Terry, the author said that he had experimented only with low-grade reclaimed rubber and that, therefore, the statement that accelerine was of no use with reclaimed rubber might have to be modified in the case of high-class alkali reclaims. With regard to detection of accelerine it was usually noticed that the acetone extract had a dark color. Mr. Smith, as one who had used a good deal of accelerine, commented on the fact that all the samples shown were in sheet form press-cured, and suggested that difficulties had arisen from blowing in the case of solid rubber, steam-cured. On this matter, and also as to whether accelerine was useful in eliminating the effect of the variability in plantation rubbers, the author said that the present extent of his experience did not allow him to express a decided opinion. It was agreed that accelerine had a decided though faint darkening effect on rubber and that its use was not desirable in the case of very white rubbers.

PIPERIDE ACCELERATORS TO BE MADE IN ENGLAND

An interesting matter in connection with the use of accelerators came before the patent authorities a little time ago. This was an application by the North British Rubber Co., Limited, to manufacture for its own use accelerators patented in this country by the Bayer Co. This application was opposed by Alfred Smith & Co., a Manchester firm of rubber chemical manufacturers, which had obtained the sole agency for the manufacture and sale under royalty. At a later date an application was made by the Hooley Hill Rubber & Chemical Co., located a few miles from Manchester, for a license to manufacture for its own use and to sell to others the piperidine accelerators patented by the Bayer Co. These licenses have been granted. It is noticeable that though either time or sulphur may be saved by the use of accelerators in practice the saving in time is always aimed at, despite the phenomenal rise in the price of sulphur in the last two years. Of course, it may yet turn out that the rapidity of vulcanization is not altogether to the benefit of the rubber goods as regards lasting capacity.

BUSINESS PRINCIPALS REQUIRED TO REGISTER.

The Registration of Business Names Bill having now come into operation it is imperative for the A B C and X Y Z Rubber companies which may be doing a retail business in towns to register the names of their principals. Although the act is essentially a piece of war legislation aimed at alien traders it may be remembered that the idea is by no means new, as previous bills have been brought before Parliament by private members to achieve the same object. These bills, however, failed to pass into law, owing to non-alien obstruction.

THE LABOR PROBLEM AFTER THE WAR

The period of demobilization is seen to be one in which troubles, if not actually chaos, may well be expected if the matter is not taken in hand by experts removed from officialdom. It is interesting, therefore, to note that a strong executive committee has been formed by the Federation of Employers and Employees to tackle the problem of the reabsorption into industry of labor released from military duties. On this committee the name of James Tinto, head of the Irwell & Eastern Rubber Co., Limited, appears as representative of

the rubber trade. I may mention that H. L. Rothband, of Mandleberg & Co., Manchester, has issued a book explaining his scheme for promoting the employment of disabled soldiers and sailors. An objection to what is at present being done by the labor exchanges is that the latter ask the manufacturers what wages they are prepared to pay a man before they have had an opportunity, by interview, of forming an estimate of the man's probable worth.

TRADE NOTES.

The establishment of the Pirelli General Cable Works, Limited, at Southampton, has been in operation two years. It is probably the most modern in equipment of all such works. Situated on a private pier, with a great electrical crane and with monorail system, its materials and its finished product can be quickly received, moved to any portion of the plant or shipped with facility. Only a third of the available area is covered with two-story buildings. All the machinery is propelled by electricity, secured from the city mains. A boiler house supplies steam for rubber working, cable heating and drying, and the lead furnaces are heated by gas produced on the grounds. Both rubber and paper insulated wire are manufactured, as well as tape and insulating material.

This corporation is a joint enterprise of two world-known concerns, the General Electric Co., Limited, one of the largest firms of electrical manufacturers in Great Britain, and Pirelli & Co., of Milan and Spezia, Italy, the largest producers of rubber goods and cables in Italy. Its work is largely on government orders.

The Parent Tyre Co. has virtually all its capital of over £2,000,000 invested in the Dunlop Rubber Co., and it has an agreement for a royalty of 6 per cent on the Dunlop net profits. This year the royalty amounts to £24,000, compared with £23,410 a year ago. The maximum dividends of 5 per cent and 8 per cent have been paid on the preferred and common shares, the deferred shares getting 7 per cent.

In a recent High Court trial, judgment was given for the Alpertons Rubber Co. in an action to prevent Mr. Manning, its late manager, from utilizing his formula book for the benefit of the Beldan Tyre Co., by whom he is now employed. There were special circumstances in this case, and I am not criticizing the judgment. The defendant's counsel, however, asked leave to appeal, saying that the decision affected works managers generally, as they had always considered that they had a right to utilize formulas acquired by them in the course of their employment. The leave to appeal was not granted, though there are many in the trade who would like to have heard the decision of the Appeal Court.

THE SITUATION IN RUSSIA.

By a Special Correspondent.

THE remarkable overthrow of the monarchy and probable establishment of a republic has opened Russian doors to America and promises to become a milestone in Russian-American trade relations. With one-sixth of the land area of the globe and a population of nearly 200,000,000, our country has long presented one of America's largest possible foreign markets, and one that has been growing rapidly with a rising civilization and quickening development. Although the circle of the Imperial family had other preferences, the Russian people, if they can maintain the new government, as now seems likely, will welcome American goods for immediate needs, and after the war, private capital for the development of vast natural resources.

There is every indication that no contracts or debts will be abrogated as a result of the revolution, as the government's finances are in excellent condition, and the policy of the people contemplates a more energetic prosecution of the war.

BANKING FACILITIES.

The banking machinery of Russia consists of The Imperial Bank, the Land Banks and the Government Savings Banks, all operated by the banking department of the government; the commercial or joint stock banks, which are private institutions; municipal banks, and mutual credit societies. The Imperial Bank is the largest bank in the world, its statement for October, 1916, showing total assets \$5,150,000,000 at the par value of the ruble*, and the total gold resources of \$1,854,000,000. It is the bank of issue for the entire empire, and although it may do a commercial banking business, its principal activities are with other banks, for which it receives deposits, makes loans and rediscounts bills. The Land Banks are of two classes, known as the Land Bank of the Nobility and the Land Bank of the Peasants, the latter having been created to facilitate the distribution of land to the peasant classes. The government operates a State Savings Bank with over 10,000 branches scattered through the Empire, which are the depositories of the savings of the people. On October 1, 1914, their total deposits amounted to about \$875,500,000 at the par value of the ruble, but these savings have increased greatly during the war. On August 14, 1916, they approximated \$1,648,000,000. While this is attributable in some measure to the abnormal prosperity incidental to the war, it is more directly attributable to the abolition of vodka, which has encouraged expenditures chiefly for better living facilities, clothing and food, and greatly increased average savings. The total increase in approximately two years, at the par value of the ruble, amounts to \$772,500,000, and at the present exchange value, about \$450,000,000.

Joint-stock banks, established in Russia in 1864, numbered 45 with 732 branches in 1913, with a total capital and surplus of \$381,615,000 and with deposits aggregating \$1,184,500,000 at the par value of the ruble. Not only do these banks exercise the usual functions of commercial banking, but they participate in the industrial activities of the country, financing, and in some cases owning outright, various industrial and commercial enterprises. Although not organized under a general banking law, each has a special government charter and operates under the supervision of the banking department of the government. This tremendous banking capital seems to be fully employed. For many years rates have averaged high, as is natural in a partially developed country. Bank failures involving a loss by depositors are practically unknown. The business is operated according to banking principles obtaining throughout the world. The commercial laws of the country are well established and adequately interpreted by the courts, so that apparently the banking operations of the country are as stable as those of any other nation.

MOVING THE "PROWODNIK" CO. TO MOSCOW.

The removal of the entire industry of the "Prowodnik" Co., the pioneer rubber manufacturing concern in Russia, from Riga to Moscow is worthy of more than a passing notice. Here was a practically unprecedented task. An industry with a capital of 50,000,000 rubles,* possessing a plant covering 3,000,000 square meters, machinery requiring 20,000 horse-power engines, and employing 18,000 persons being transferred bodily some 600 or 700 miles, rebuilt and reestablished in the short space of a few months, is a feat well worth recording.

This great industry was situated at Riga, on the gulf of the same name, an arm of the Baltic Sea. It was manufacturing many lines of rubber goods for trade and for the Russian Government. As a measure of precaution the factory was closed, but its importance to the government was such that the removal was advised from the coast to the heart of the nation.

It was a stupendous task, but with an energy worthy of the cause, it was accomplished by the aid of a force of engineers and workmen. Over 5,000 carloads of machinery and material were

*Ruble equals \$0.515.

transported, new buildings erected, and to-day over 7,000 employees are at work, turning out goods exclusively for the use of the government.

PRODUCTS AND VOLUME OF BUSINESS.

The principal products to-day are tires, solid and pneumatic, for motor cars, trucks, motorcycles, aeroplanes and army field ambulances. Besides these are manufactured pontoon bags, life preservers, protective masks (for use against asphyxiating gases), balloon fabric, carriage cloth, insulated wire, a variety of accoutrements for use in the army and navy, and hard rubber articles for electrical and medical use.

At the time of the closing down of the Riga establishment the output of pneumatic tires was 1,000 per day, but the principal business was the production of rubber footwear. In 1914 the daily production was nearly 100,000 pairs, and the total business of the company was upwards of 65,000,000 rubles. Its main outlet consisted of the 300 stores or branch establishments throughout Russia, though its export trade was widespread and steadily extending. Indeed, so important was this department of the business deemed by the Czar that he conferred on the director general of the works the honorary title of "Councillor of Manufactures," and later, because of services to the government, "Councillor of State."

WELFARE WORK.

In this connection it may be well to show how thoroughly this great corporation is following modern methods in welfare work. At the time of closing the works at Riga there were in operation, for the benefit of the employees and maintained by the company, schools, libraries, canteens, parks, hospitals with clinics, free medical aid, lying-in hospitals, nurseries, lecture halls, and a casino. The company built comfortable dwelling houses for its workers, established free savings banks, insured the lives of all workers after ten years' service and provided accident insurance and sick benefits. Not all these have yet been reestablished at the new works at Moscow, but plans are being completed for doing so as soon as the times will allow. Meanwhile, since the commencement of the war, this corporation has maintained a hospital at Petrograd, with 100 beds, for soldiers wounded in the defense of Russia.

Despite the heavy expenditures engendered by this removal, the company paid 10 per cent dividends in 1914 and 1915.

"TRËUGOLNIK" PROSPERING.

The Russian-American India Rubber Co. "Trëugolnik" is in receipt of numerous testimonials from the different ministries and departments of the government testifying to the satisfactory manner in which it is serving the cause in the interest of national defense. The plant at Petrograd is being worked to its utmost capacity, and almost exclusively on government work, supplying all kinds of rubber articles used by the different departments for war purposes.

It is reported that this company contemplates increasing its capital. Starting over 50 years ago with a capital of 500,000 rubles, this has been increased at various times. Only last year it was raised 9,000,000 rubles, and this latest report is that the contemplated increase will bring the capital stock up to 30,000,000 rubles, new shares being issued at the rate of 200 rubles for each 100 ruble (nominal) share. The company manufactures practically everything in rubber goods, and has been wonderfully profitable to its shareholders.

NEW RAINCOAT FACTORY IN AMSTERDAM

Despite the scarcity of building supplies, raw materials and other difficulties incident to the war, a new establishment for the manufacture of waterproof clothing, to be known as the Hollandia Factories, has been erected by Kattenburg & Co., Amsterdam, Netherlands. The building is 262 by 58 feet, five stories high, and about 1,000 persons will be employed. Aside

from raincoats of rubber and waterproof cloth, for men and women, certain other classes of garments for women will be manufactured. Operations were recently begun with a large stock of materials, and the rapid growth of the plantation industry in the Dutch East Indies gives reasonable assurance that rubber for the principal product of the firm will not be wanting.

CRUDE RUBBER SWINDLE IN HOLLAND.

A rather ingenious scheme of some enterprising rascals has been discovered by the Amsterdam police. Letters have been sent broadcast telling of the existence in Amsterdam of a lot of crude rubber, not controlled by the Nederlandsche Overzee Trust, which had been smuggled into the country. The persons addressed are solicited to take shares in this rubber, and to forward proportionate sums for expenses, commissions, etc. The fact that some time ago a lot of 150,000 kilograms of crude rubber was smuggled into Holland in shipments of tobacco gave some semblance of possibility to this story but this rubber is now under control of the N. O. T., and under no circumstances will it be released. The police have sent out warnings, but as far as can be learned no arrests have yet been made.

RUBBER COMPANY'S CONTRIBUTION.

A press dispatch from Berlin of March 9, makes the announcement that the first subscription to the sixth German war loan was made by the Continental Caoutchouc & Gutta Percha Co., of Hanover, and amounted to \$2,500,000.

THE RUBBER TRADE IN JAPAN.

By Our Regular Correspondent

ACCORDING to the official statistics, 1916 imports of crude rubber into Japan showed an increase of 2,727,832 pounds, and \$1,897,209 in value over 1915. This was due to double the previous home demand and a greatly developed export market.

IMPORTS OF CRUDE RUBBER.

From	1915		1916	
	Pounds.	Value.	Pounds.	Value.
British India	1,114,441	\$479,329	1,334,337	\$743,582
Straits Settlements	2,017,176	863,593	4,648,894	2,484,147
Dutch East Indies	299,774	113,083	174,600	82,609
Great Britain	352,164	196,865	351,150	240,188
United States	68,433	58,819	92,248	67,415
Other countries	1,748	13,109	36,152	5,664
Totals	3,853,836	\$1,713,798	6,631,382	\$3,613,045

IMPORTS OF RUBBER MANUFACTURES.

	1915.		1916.	
	Pounds.	Value.	Pounds.	Value.
Reclaimed rubber and unvulcanized rubber	168,060	8,608	267,596	\$42,256
Dental rubber	12,527	29,003	21,570	49,675
Soft:				
Roads and roads	75,900	1,041	111,399	47,792
Plates and sheets	77,641	12,056	81,609	27,390
Tubes	49,004	1,000	140,694	43,662
Belts and beltings for machines	2,490	10,326	45,670	21,179
Threads, stop bands, ropes and webbers	76,877	13,660	63,128	86,584
Other soft goods	8,808	4,386	11,058	7,988
Hard:				
Turnips, blocks, plates and sheets	7,777	7,868	12,560	11,776
Other hard goods	11,304	2,512	7,361	4,375
Bicycle tires	7,777	4,386	11,058	13,460
Insulated electric wire:				
(1) Armored with metal				
Submarine telegraphic or telephone		1,4637		147,330
Other armored cables	531,390	53,956	4,494	796
(2) Other:				
Power cables	46			
Other cords	4,693	2,440	26,264	10,723
Rubber boots	1,100	1,100	31,240	19,307
Rubber overshoes	21,500	11,454		
Woven beltings for machines and hose	173,984	94,984	202,607	144,891
Waterproof tissues	24,740	16,637	15,808	13,212
Electric webbing				
Electric webbing				
Electric webbing				
Total				\$3,777,494

These, including increased imports of submarine telegraphic and telephonic cables, rubber boots, and overshoes, have not been made in sufficient quantity, nor as well, in Japan. The demands for reclaimed rubber have been gradually increasing. Waste rubber produced in Japan in 1916 amounted to about 50,000,000 pounds [\$175,000], 60 per cent being used for 300,000 pairs of "Tabi" soles [\$120,000], 200,000 pairs of "Zuri" soles [\$120,000] and 1,000,000 pairs of "Tabi" soles [\$150,000], and the remaining 40 per cent for other goods.

EXPORTS OF MANUFACTURED RUBBER GOODS

1915. 1916.

Jinrikishas were also exported to the number of 9,465 [\$170,743] in 1916 against 7,931 [\$129,564] in 1915, and bicycles and parts (exclusive of tires) to the value of \$806,815 in 1916 against \$277,326 in 1915. Moreover, in 1916, there were exported rubber dolls, balls and balloons to the value of about \$500,000 and 1,200,000 valves for bicycle and automobile tires to England, United States and Australia. A new line of exports to Singapore consisted of 6,145,796 [\$110,247] porcelain latex cups and 1,565,621 [\$32,492] glass latex cups.

Japanese manufacturers were hampered by double the normal price of coal and four or fivefold increases in the prices of ingredients, but their troubles were lessened by large production and some firms were able to declare dividends of 10 to 40 per cent. Makers of druggists' sundries, toys and balloon fabrics exported their goods to England, British India, Canada and the United States mostly through Japanese traders in Yokohama or Kobe. Rubber tire makers consumed about 1,800,000 valves, 80 per cent of this number of tires being exported. Home demands increased 30 per cent above the 1915 consumption. Mechanical rubber goods production was about double that of the preceding year, consisting for the most part of hose and packing.

Several small companies were organized during 1916 and most of the well-established firms enlarged their factories to increase capacity. The Kōno Rubber cloth works at Tokio, which was burned last summer, has been rebuilt during the winter and The Fujikura Electric Wire Co., Limited, also in Tokio, and one of the largest electric wire works in Japan, which was destroyed by fire in the winter at a loss of about \$150,000, will also probably be rebuilt under the new factory law which went into effect September 1, 1916.

DUNLOP RUBBER CO. REORGANIZES

The Dunlop Rubber Co. (Far East), Limited, of Japan, held a meeting of creditors at the company's offices, Wakinohama, Kobe, on February 16. The company was placed in voluntary liquidation for the purpose of transferring the business to a new corporation to be organized under the laws of the Empire of Japan. The new corporation, which will have the title of The Dunlop Gomu Kabushaki Kaisha Corporation, will take over all the assets and liabilities of the old company and continue the business under the same management.

JAPANESE POTASSIUM CHLORATE INDUSTRY GROWS.

Since the outbreak of the European war the number of firms manufacturing potassium chlorate in Japan has increased from one to at least eight, and production has increased from 300 to over 3,500 tons a year, much of it being exported to China, Russia and the South Sea Islands. Firms manufacturing this product must have the permission of the government in order to export it.

BRAZILIAN NOTES.

THE competition of Eastern rubber is one of the gravest questions which Brazil is to-day called upon to face. The tremendous increase in the production of plantation gum, and its steadily diminishing cost of production places this country in the position which necessitates a similar decrease in the expense of gathering and forwarding this country's product. The Para and the Amazonas state governments recognize this necessity, and are encouraging agricultural expansion, with the object of producing at home the various food materials which are now imported at high cost.

The financial crisis, which commenced prior to the European conflict, but which was undoubtedly heightened by that conflict, appears to have diminished in effect and steadily improved conditions are confidently predicted.

THE TELEGRAPH COMPANY PROSPERS

The Amazon Telegraph Co., whose lines extend more than a thousand miles up the Amazon, has had a successful year, its net profits showing a gain of £6,886 over that of 1915. The line is now double the entire distance from Para to Manaus, each being on a separate route, thus lessening the liability of failure of communication through freshets, windfalls, or interference by the natives. It is now very seldom that both lines are simultaneously out of commission.

Mr. Keith's position as chairman and managing director has been filled by the appointment of F. E. Nosworthy, who was in complete control of the company's Amazon business, and who made the survey for the second line in 1907 to 1909 and superintended the completion of that project in the two following years. He predicts a brilliant outlook for the company's business the present year, largely based on the prosperity of the rubber and cocoa production of the Amazon basin.

A GROWN UP RUBBER FACTORY

A well-equipped rubber factory employing 30 workmen and producing a variety of mechanical goods is one of the industries of Sao Paulo, Brazil. It was founded four years ago, is owned by Theodoro Putz & Cia., and represents a capital investment of \$35,000.

The factory, located at 179 Abilio street, is equipped mainly with British and German machinery consisting of the usual washers, mixers, calenders, vulcanizers, etc., all driven by electric power.

The principal manufacture consists of solid tires of several kinds for auto trucks and heavy vehicles. A large variety of mechanical goods is manufactured. Car springs, electrical articles, hose, tubing packings, cylinders for coffee and rice machines, heels, etc., in fact, almost every kind of rubber goods except tire casings, inner tubes and fabrics. The crude material is mainly mangabeira rubber, produced in the State of Sao Paulo, and Amazon grades, shipped direct from Para.

TRINIDAD RUBBER SHIPMENTS INCREASING.

For the month of January, 1917, shipments of crude rubber from Trinidad totaled 1,164 pounds, all of which was sent to the United Kingdom. During the same month in the years 1912, 1913, 1915 and 1916 no shipments are recorded, and in January, 1914, only 105 pounds were exported.

RUBBER FOOTWEAR DUTIES IN COLOMBIA.

Duties on merchandise imported into Colombia are levied on the gross weight (so much per kilo = 2.2 pounds), which includes paper, cartons, and the case, box or crate in which the goods are packed. Shoes wholly of rubber are dutiable at \$1 per kilo; cotton duck uppers, with rubber soles, \$1.50 per kilo, and linen uppers with rubber soles, \$1.70 per kilo.

Rubber Planting Notes.

INSURING THE PURCHASE OF HEALTHY RUBBER SEED.

A PRACTICAL means of ascertaining the proportion of healthy seed in a large quantity is suggested by C. M. Hamaker in the "Netherlands-India Rubber News."

Out of a shipment ready for transportation, 100 healthy and 100 sickly seeds are taken, opened and weighed. The latter are easily found by their much lighter weight, usually about 2 grams.

The seed for shipment is then placed in boxes or bags by means of a measure containing 100 seeds. The number of the measures thus packed into each box or bag being counted, it is an easy matter to ascertain the total.

As the average weight of a healthy seed can be computed, it is simple to determine what proportion of the total contents is composed of healthy seeds. The difference between the calculated and the actual weight, divided by the difference in weight of a healthy and a sickly seed, gives approximately the number of the latter which must be in the box.

FIRE LOSS AND RESPONSIBILITY.

A very considerable loss of young rubber trees is reported on the United Temiang (F. M. S.) Rubber Estates, nearly a hundred acres of four-year-old trees being damaged by a fire which spread from a neighboring estate owned by Japanese. A judicial decision has been obtained finding the Japanese owner liable for the damage done, the amount to be paid by him being referred by the Court to an arbitrator.

BRITISH NORTH BORNEO PRODUCTION INCREASES.

While the exact figures for 1916 are not yet available, it is estimated that the rubber production of British North Borneo increased 1,140,000 pounds over that of the calendar year 1915. There are now 24 rubber producing companies, a gain of five over the previous year.

PROGRESS OF HEVEA PLANTING IN BRITISH GUIANA.

According to the government report for 1915 the planting of *Hevea* in British Guiana is increasing slowly. It is estimated that at the end of that year nearly 5,000 acres had been planted with *Hevea*. The Department of Agriculture sold 23,000 young trees to planters that year.

The report goes on to say that it has been conclusively proven that this Para rubber tree grows well on suitable lands in the colony and that tapping is just beginning, as the majority of the trees in the planted area are young. These initial tappings of five and six year old trees have shown that the yields of dry rubber per tree compare very favorably with those obtained in the Straits Settlements, Malaya and Ceylon, and that the quality of the product is excellent. Tapping operations will be on a far larger scale hereafter.

The balata industry, which had suffered adversely at the commencement of the war, had practically quite recovered by the beginning of April, 1915, and bleeding operations were pursued as hitherto during the period. The quantity of balata exported during the year was 1,557,213 pounds. Fourteen companies and individuals controlled this output.

PERU'S RUBBER EXPORTS.

The Peruvian Government recently published statistics of foreign trade for the calendar year 1915, which show that crude rubber exports from that country during that period amounted to \$2,937,891, compared with \$2,169,445 in 1914.

LIMA BEAN AS A COVER CROP IN RUBBER PLANTING.

In Java extensive use is made of the lima bean (*Phascolus lunatus*) as a cover crop on rubber plantations. This legume, locally called Kratok, is sown and allowed to run on the ground between the rows of rubber trees, leaving a clean, cultivated strip of land in which the trees are growing. The vines are cut back from time to time so as not to interfere with the tapping and collection of latex, and of course are not allowed to climb the rubber trees.

In addition to its value as a nitrogen gatherer, the lima bean is valuable in preventing soil evaporation in the dry season, and in impeding soil erosion during the wet season. It is also of exceptional value for smothering weeds. The usual procedure is to plow and harrow, plant three seeds in each hill, the hills being from 20 to 40 inches apart, and give one or two hoeings to clear away weeds until the plants are well established.

DUTCH EAST INDIA PROSPEROUS.

The Dutch East Indies are producing a steadily increasing quantity of rubber. In 1916 this amounted to about 12 per cent of the world's total production. Experts declare that rubber will eventually head the list of agricultural exports from these islands. Plantation rubber has gained so greatly over forest production that even if prices drop considerably after the war, the plantations can still sell at a profit, whereas work in the South American forests will have to be curtailed.

The chances of competing successfully with the British East Indies are held to be favorable. The plantations in Ceylon and the Straits Settlements cover an area twice that of those in the Dutch East Indies. The climates and soil correspond, and the average yield per tree under similar conditions is practically equal. But labor is cheaper and more easily obtained in the Dutch East Indies and the taxes and duties are lower than in Ceylon and the Malay States. Dutch planters are therefore able to produce rubber at a lower cost than their competitors. The fact that British planters are highly taxed for war expenses gives the Dutch planters an added advantage.

The prospects for 1917 are very satisfactory. The United States was a large buyer in 1916, the total exports to that country being 9,500 tons. The figures for 1917 are expected to be still more favorable. Numerous companies have already sold a great part of their 1917 crop to United States buyers at very profitable prices.

FUNTUMIA RUBBER IN THE CAMEROONS.

Rubber has become an increasingly important product of the Cameroons. Until just previous to the European war the exports of this product formed nearly 50 per cent of the total exports, amounting, in 1913, to a value of \$2,804,220. The first attempts at rubber exploitation were made in the northern part of the colony, where the *Landolphia florida*, which was then regarded as the greatest rubber-producing plant, was found. About 1901 the vast forests of Southern Cameroon were discovered to contain great numbers of *kickxia* trees, and the natives were soon set to gathering the "silk rubber" therefrom; but their methods were crude, and resulted in the destruction of so many trees that the movement soon fell off. The rubber crisis of 1912 also caused a decrease in the wild-rubber trade, but at the same time it gave considerable impetus to the establishment of rubber plantations.

Realizing that the *Funtumia (Kickxia) Elastica* was indigenous to the Cameroons, the German planters commenced to cultivate it about four or five years ago, and now there are many plantations containing thousands of trees that will soon

rubber. "The Journal of the Royal Society of Arts," referring to the rubber plantation in the Congo, states that the yield of the rubber trees of planted areas is calculated at about 30s. per acre for the first year, 22s. for the second, 18s. for the third, and 10s. for the fourth. The trees begin to bear during the fifth year, and it is said that over 1½ pounds of dry rubber may be obtained from a six-year-old *Funtumia* tree. The cost of tapping the trees and shipping the product to Europe should not exceed 1s. 3d. per pound, and, if properly prepared, it is the belief of that journal that the Cameroon plantation rubber will fetch about the same price as the best Para rubber in European markets. Native labor is fairly plentiful in the rubber-growing districts and costs, including board, about £1 per month. It is likely, therefore, that rubber will continue to prove the most important product of the Cameroons for many years.

THE SITUATION IN MALAYA AND JAVA.

WILL Singapore become the world's market for rubber? The question is one which is being considered throughout the rubber-producing sections of the East. The general feeling here is that the war has not so far affected very severely the prosperity of the Malay peninsula. On the contrary, in many ways it has been distinctly favorable. Still, there are some changes noticeable, socially and commercially, which create comment and on which opinions differ. Principal among them is the so-called "American invasion." Americans are settling here. They are buying land and cultivating rubber. They are here attending the auctions, and buying rubber to ship direct to America. The closing of rubber auctions in Europe has caused this, and with this has come the question which heads this paragraph.

Yet there are many who are inclined to resent the increasing number of Americans, and their persistence and steady progress in the trade. Some of this is rightly attributable to loyalty to the mother-country, whence most of the capital came to establish and nurture the plantation industry. Yet there is no doubt that the presence of these busy, bustling Yankees is distinctly advantageous to Singapore as a market, and the whole of Malaysia as a rubber-producing country.

However, there are persons here who think otherwise. In a recent number of the "Malay Mail" a correspondent who signs himself "Anti-Yank," after expressing a certain amount of gratitude for the winding-up of the affairs of a "too numerous alien enemy competition," has quite a little to say about the success of the American encroachment upon the rubber tire industry in the Straits, and further expresses surprise in noting the way in which goods of American manufacture are being patronized to the detriment of the British manufacturers "who were the originators of the rubber tire industry."

The only apparent reason for this, according to the writer, is a lack of patriotism on the part of his countrymen.

Notwithstanding the decline in the price of rubber, there seems to be about the normal amount of money in circulation, and retail traders reported a very good Christmas and New Year's trade, though, since then, general business has shown a tendency towards conservatism in some quarters. Rubber dealers are adopting a cautious policy, because of present price conditions. It is reported that at certain outstations some sizable parcels of Smoked sheet, which might be considered No. 1 in quality, have sold as low as \$100 a picul (42.6 cents per pound). Even at this price, however, it leaves a good margin of profit to the native producer.

Planters in the Sepang district are having some difficulty in

maintaining their native labor forces, owing to a repetition of the assaults by tigers. Some native laborers have been killed, and this has caused desertions from the working forces. The planters are now demanding that the M. S. V. R. be called to exterminate these dangerous creatures.

THEFT AND INCREASED LICENSE FEES.

The increasing number of rubber thefts during the past year, and the dissatisfaction caused by the seeming inability of the police to prevent this practice, or to detect and punish the offenders, led to a proposed amendment, by which the fee for licenses granted to dealers who purchase rubber should be raised from \$25 to \$250 and the deposit from \$200 to \$2,000. This would have two effects, a lessened number of licensees, or a greatly enlarged sum available for better police protection, or both. The dealers protested, claiming that the proposed increase would interfere greatly with the entire rubber trade, but finally a bill has been rushed through, at a meeting of the Federal Council at Kuala Lumpur, by which the license fee is raised to \$100 and in place of a deposit of \$200 in cash, the licensee is required to enter into a bond with sureties for the due performance of the obligations imposed.

BATAVIAN STOCK TRADE LIST ADVISED.

The Rubber Trade Association of Batavia has sent a circular to its members, suggesting that meetings be held semi-weekly and that all free rubber on hand be listed so that no time may be lost, nor orders remain unfilled through difficulty in locating the required stock. It often happens that when an exporter receives an order from some foreign customer he frequently has to scour the entire market. Not infrequently a lot of rubber which has been offered subject to acceptance of the foreign customer has been sold before such acceptance has been forwarded. Then the exporter may be obliged to spend a considerable amount of time, and some money, to locate available rubber to fill such belated order. The semi-weekly listing of all rubber on hand, its quality and price, would be beneficial to both buyer and seller, and the circular mentioned asks for coöperation in the movement for the simplification and consequent improvement in business.

PALE CRÊPE SAMPLE STANDARDS.

All sales contracts made under the rules of the Rubber Trade Association of Batavia, as decided at a general meeting held last June, stipulated that any certain quantity of rubber purchased must be delivered with a minimum of 75 per cent Pale crêpe according to the standard samples of the society. A circular sent out by the society emphasizes that in no single instance of the established rules a word was spoken of a "color-shade," in this connection. The reason why the term "color-shade" was avoided was because the various conceptions of certain colors are so divergent. Many disputes have arisen between buyer and seller, which are not always easily adjusted, because a single standard Pale crêpe sample does not exist, and cannot be prepared.

There are three established standard samples: First quality crêpe numbers 1, 2 and 3; and these terms, and no others, are advised in selling contracts.

INTERPLANTING COCONUT GROVES WITH RUBBER.

A report comes from the Lunas Rubber Estate that owing to the continued unsatisfactory conditions of its coconut harvest the management has decided to interplant its coconut area with rubber. The estimated crop for the next financial year is 175,000 pounds of rubber and 60,000 coconuts.

A NEW DUTCH TRADING CORPORATION.

A new company, with the support of, and in conjunction with, the Netherlands Trading Co., has been formed under the name of the Holland-Ceylon Handels Maatschappij with a capital of 200 million guilders [\$80,000,000] and will conduct important trading operations in the Far East.

ISSUED FEBRUARY 14, 1917.

- 14,859 (1915). Bottle stopper comprising a rubber ring. E. A. Matthias, 6 Stanley street, Liverpool.
- 14,948 (1915). Non-skid chain. F. Nace, South Broad street, Trenton, New Jersey, U. S. A.
- 102,648. Inner tube comprising gas inflated sections. P. Harder, New York, U. S. A.
- 102,702. Stiffeners for corsets made of wire twisted, woven, or plaited and covered with rubber and vulcanized. E. Lawrence, National Bank, Melbourne, Australia.
- 102,716. Puncture proof band. A. Baigne, 439A Beaudry street, Montreal, Canada.

ISSUED FEBRUARY 21, 1917.

- 15,001 (1915). Rubber covered pneumatic roller. J. Muskett, 42 Dela-
chester.
- 15,080 (1915). Life-saving suits. I. Gilbert, 6814 South Halsted street,
Chicago, Ill., U. S. A.
- 15,195 (1915). Rubber or gutta-percha used in making artificial stone.
M. I. Poznan-ski, Hotel National, Quai du Lemau,
Geneva.
- 15,269 (1915). Leather substitute with rubber layer. A. L. Nielsen, 47
Tire tool. T. Clark, 20 Frazer street, and T. Watson,
Rubber heel tread. I. R. K.
Tire valves and method of attachment to tires. A. E.
Painters' blanket. J. F. Haskins, 159 West 103rd street,
New York City.
- 15,411 (1915). Solid tire with rubber band and rubber tread studs. T.
lithgowshire.

THE DOMINION OF CANADA.

PATENTS ISSUED.

- 172,967. Tire armor. J. W. Hayes, Trenton, Ont.
- 173,003. Rubber and fiber sole. T. C. Redfern, Hyde, Chester, England.
- 173,024. Mold for hot water bottles. Canadian Consolidated Rubber Co.,
Limited, Montreal, Quebec, assignee of E. Stahl and W. Klein
—both of Naugatuck, Connecticut, U. S. A.
- 173,046. Tire tool. J. M. Barrie, Stockton, and E. F. Fuchs, Livermore,
assignee of a half interest—both in California, U. S. A.
- 173,068. Sectional pneumatic tire. J. Girard, Montreal, Quebec.
- 173,085. Combination raincoat and petticoat. D. Dandurand, Montreal,
Quebec.
- 173,111. Recoil pad for guns. W. R. Jorgenson, Chicago, Illinois, U. S. A.
- 173,123. Syringe. C. L. Loffer, Minneapolis, Minnesota, U. S. A.
- 173,144. Rubber bottle cleaning brush. The Sanitary Bottle Washing Co.,
Limited, assignee of E. Schwarz—both of Chicago, Illinois,
U. S. A.
- 173,214. Rubber horse-shoe pad. R. Welling, assignee of J. J. McMullen—
both of Buffalo, New York, U. S. A.
- 173,217. Metal plug for rubber heels, etc. F. Berenstein, Chelsea, and
W. Berenstein, Boston—both in Massachusetts, U. S. A.
- 173,229. Combined tire valve and rubber patch. C. E. Baker, Carmar-
then, Carmarthenshire, Wales.
- 173,240. Tire valve cap. R. A. Campbell, Minneapolis, Minnesota, U. S. A.
- 173,279. Medicine dropper. F. C. La Grange, Cedar Rapids, Iowa,
U. S. A.
- 173,361. Teat cup. The Empire Cream Separator Co., assignee of A. C.
MacIntyre—both of Bloomfield, New Jersey, U. S. A.
- 173,416. Suction cup massage instrument. J. W. Bond, Providence,
Rhode Island, U. S. A.
- 173,488. Belt for machinery. W. J. Sadler, Montreal, Quebec.
- 173,491. Tire. D. H. Shapiro, Montreal, Quebec.
- 173,494. Fabric glove with rubber impregnated palm and fingers. J. P.
Tubular fabric for tires, hose, etc. L. A. Subers, Cleveland,
Ohio, U. S. A.

THE FRENCH REPUBLIC

PATENTS ISSUED WITH DATES OF APPLICATION.

- 481,850 (August 21, 1915). Perfection in pneumatic automobile tire auto-
matic air discharge. A. Broussois.
- 481,393 (April 4, 1916). Elastic wheels. A. J. Anderson.
- 481,585 (April 25, 1916). Elastic wheel. J. E. Strietelmeier.
- 481,616 (April 28, 1916). Improvements in pneumatic tires. E. H. Rer-
rick.
- 481,673 (May 6, 1916). Elastic cushion saddle for bicycles, motorcycles,
and other similar vehicles. E. Mariani and S. Radaelle.
- 481,680 (May 8, 1916). Hot water bottle with protecting cover; other
analogous articles of rubber and the process of their manu-
facture. E. Rowe.

- 481,796 (May 19, 1916). Cellular tires for automobile wheels. J. C.
Anderson.

NEW ZEALAND.

ISSUED JANUARY 18, 1917.

- 38,127. Milking machine teat cup. The Walseley Sheep Shearing Machine
Co. Limited, Street Works, Albion Street, Auckland, New Zealand.

ISSUED FEBRUARY 8, 1917.

- 37,051. Rubber sole and heel pad. W. W. Phillips, 142, 144, and 146
Old street, London, England.
- 38,280. Pneumatic tires. J. C. Barker, 14-20 St. Mary Axe., London,
England.

DESIGNS.

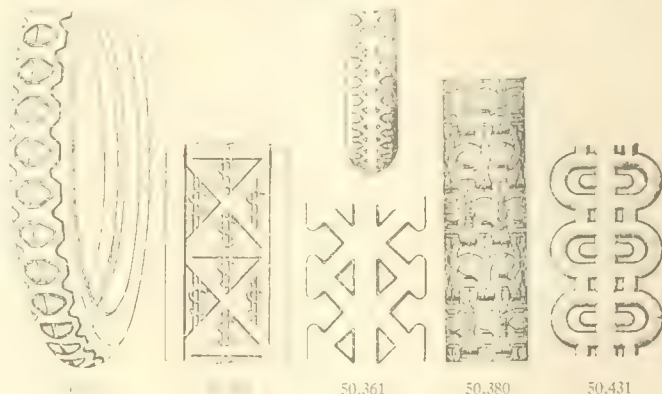
THE UNITED STATES.

- 50,389. Having Term 14 years. Patented February 20, 1917. C. W.
Joslin, Cleveland, Ohio, assignor to Mechanical Rubber Co.,
Passaic, N. J.

DESIGNS FOR TIRES.

THE UNITED STATES.

- 50,352. Automobile tire. Term 14 years. Patented February 20, 1917.
R. H. Keaton, San Francisco, Calif.
- 50,360. Automobile tire. Term 3½ years. Patented February 20, 1917.
C. B. Reynolds, Sawtelle, Calif.
- 50,361. Having Term 14 years. Patented February 20, 1917.
W. A. Robbins, Glen Ridge, N. J.



- 50,380. Tire-tread. Term 14 years. Patented February 20, 1917. W. D.
Freese, Akron, Ohio.
- 50,431. Tire-tread. Term 14 years. Patented March 6, 1917. D. Spence,
assignor to The Norwalk Tire & Rubber Co.—both of Norwalk,
Conn.

THE DOMINION OF CANADA.

- 4,157. Tire tread—a tread provided with ribs of herring bone
form flattened at their central portions, at each side of the
median plane being an oval-shaped depression formed in each
rib. Dunlop Tire & Rubber Goods Co., Limited, Toronto,
Ontario.

- 4,157. Tire tread—a tread provided with ribs of herring bone form flat-
ened at their central portions, at each side of the median plane
being two round-shaped depressions formed in each rib. Dun-
lop Tire & Rubber Goods Co., Limited, Toronto, Ontario.

TRADE-MARKS.

THE UNITED STATES.

- 99,836. The words RUBBER, rubber, rubber, and cement, vulcanizing cement, soldering paste, and auto-patch. Durkee-
Atwood Co., Minneapolis, Minn.
- 99,839. The word BRIGADIER—rubber pneumatic tires. Continental Rubber
Works, Erie, Pa.
- 100,007. The word ROADBEATER—rubber tires. The Gordon Tire & Rubber
Co., Canton, Ohio.
- 100,096. The representation of a heel, with six circles and the words
NATIONAL SAFETY HEEL thereon—rubber heels. Hanover Rub-
ber Co., Hanover, Mass.
- 100,150. A circular design—elastic vehicle tires. The American Rubber &
Tire Co., Akron, Ohio.
- 100,323. The word SHERICO—rubber tires. Southern Hardware & Bicycle
Co., Jacksonville, Fla.
- 96,844. The words PIG SKIN—machinery packing made partly of rubber
and partly of asbestos. The Manhattan Rubber Manufacturing
Co., New York City.
- 97,227. The words "TINKER" DELIVERY SYSTEM—rubber-stamp outfit and
inking pad combined. M. Tinker, Baltimore, Md.
- 98,839. The word PHYBTR—a rubber composition in sheet form. The
Manhattan Rubber Manufacturing Co., New York City.
- 100,073. The word STANWAL—rubber matting. Standard Woven Fabric
Co., Walpole, Mass.
- 92,753. A representation of an oval figure—rubber bumpers for closet-
seats, rubber stoppers for lavatories, sinks, and bath, rubber
screw and tack bumpers, and closet-seats. L. R. Lenich, Union
City, Ind.

- 96,888. The words WOOD CORD and CORD in the center of a circle—brushes. The Boeckh Bros. Co., Limited, Toronto, Ontario.
- 97,498. The word SLOW BELTING, inside a circle—brushes. The Boeckh Bros. Co., Limited, Toronto, Ontario.
- 100,000. A representation of a seal with the word BELT in the center, and SEAL below—belting and hose. Crandall Packing Co., Palmyra, N. Y., and Birmingham, Ala.
- 100,340. The word MADERITE—water-bottles, fountain-syringes, combination-syringes, face-bags and ice-bags. The Seamless Rubber Co., New Haven, Conn.
- 100,450. A representation of a woman with the word OKIDE in the center, and heels. Quabaug Rubber Co., Brookfield and North Brookfield, Mass.
- 100,604. The words OKIDE in the center of a seal with the word OKIDE in the center, and heels. Quabaug Rubber Co., Brookfield and North Brookfield, Mass.
- 100,766. The word BELT in the center of a seal with the word BELT in the center, and heels. Quabaug Rubber Co., Brookfield and North Brookfield, Mass.
- 101,024. The word WILLOW in the center of a seal with the word WILLOW in the center, and heels. Quabaug Rubber Co., Brookfield and North Brookfield, Mass.
- 101,025. The word OKIDE—composition insoles, box-toes and heel-counters for boots and shoes. United States Rubber Co., New York City.
- 101,026. The word SOLEX—composition insoles, box-toes and heel-counters for boots and shoes. United States Rubber Co., New York City.
- 101,063. A representation of a tire bearing a large letter F—rubber tires. The Fisk Rubber Co., Chicopee Falls, Mass.
- 101,065. The word NEOLIN—soles and heels for boots and shoes formed of an artificial composition. The Goodyear Tire & Rubber Co., Akron, Ohio.
- 101,133. The word RESILIO—rubber heels and composition soles. Sears, Roebuck & Co., Chicago, Ill.
- 100,160. Design comprising an albatross and a shield with the letters ALBATROSS in the center, and shield. Crandall Packing Co., Palmyra, N. Y., and Birmingham, Ala.
- 100,161. Representation of a seal with the word BELT above and SEAL below—belting and hose. Crandall Packing Co., Palmyra, N. Y., and Birmingham, Ala.
- 100,547. The words KLAY KORT within an oblong border—rubber boots and shoes, rubber overshoes, and rubber-sole canvas shoes. Hood Rubber Co., Watertown, Mass.
- 100,548. Design containing the word LAKESIDE—rubber boots and shoes, rubber overshoes, and rubber-sole canvas shoes. Hood Rubber Co., Watertown, Mass.
- 100,549. Design containing the word BAYSIDE—rubber boots and shoes, rubber overshoes, and rubber-sole canvas shoes. Hood Rubber Co., Watertown, Mass.
- 100,550. Design containing the word FENWAY—rubber boots and shoes, rubber overshoes, and rubber-sole canvas shoes. Hood Rubber Co., Watertown, Mass.
- 100,817. The words MONKEY GRIP—automobile-tire patches. Auto Supply House, Oklahoma, Okla.
- 100,926. Representation of a key placed diagonally across a shield design—inner tubes, liners and patches for the same. Keystone Rubber Manufacturing Co., Erie, Pa.

THE UNITED KINGDOM.

- 376,110. Two circles one within the other, between both of which is written SCOTLAND, in the center the emblem of Scotland. The North British Rubber Co., Limited, Castle Mills, Fountainbridge, Edinburgh, Scotland.
- 376,275. The word CONQUEROR—boots, shoes, slippers, overshoes, leggings and gaiters. United States Rubber Co., Limited, 47 Farringdon street, London, E. C.
- 376,296. The word AQUAVITA—raincoats. Butt, Vosper & Knight, 103 Old Town street, Plymouth.
- 376,206. A representation of two perpendicular arrows—golf balls. The North British Rubber Co., Limited, Castle Mills, Fountainbridge, Edinburgh, Scotland.
- 374,550. A design for a label for RESILIO DENTAL RUBBER—dental india rubber. Elliott & Co. (Edinburgh), Limited, 4 North St. David street, Edinburgh, Scotland.
- 71,000. A representation of a seal with the word BELT in the center, and SEAL below—belting and hose. Crandall Packing Co., Palmyra, N. Y., and Birmingham, Ala.
- 71,001. A representation of a seal with the word BELT in the center, and SEAL below—belting and hose. Crandall Packing Co., Palmyra, N. Y., and Birmingham, Ala.
- 376,389. A comic figure—golf balls. The Dunlop Rubber Co., Limited, 150 and 152 Clerkenwell Road, London, E. C.
- 376,390. A comic figure—golf balls. The Dunlop Rubber Co., Limited, 150 and 152 Clerkenwell Road, London, E. C.
- 376,204. A representation of a shield bearing the letters N. B.—golf balls. The North British Rubber Co., Limited, Castle Mills, Fountainbridge, Edinburgh, Scotland.
- 376,205. A representation of a shield bearing the letters N. B.—golf balls. The North British Rubber Co., Limited, Castle Mills, Fountainbridge, Edinburgh, Scotland.
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- 376,299. A representation of a shield bearing the letters N. B.—golf balls. The North British Rubber Co., Limited, Castle Mills, Fountainbridge, Edinburgh, Scotland.
- 376,300. A representation of a shield bearing the letters N. B.—golf balls. The North British Rubber Co., Limited, Castle Mills, Fountainbridge, Edinburgh, Scotland.

THE DOMINION OF CANADA

- 22,087. The word YOLANDA—hair combs. The North British Rubber Co., Limited, Edinburgh, Scotland.

- 22,104. The words BOECKH'S RUBBER SET and representation of a bear's head in a circle—brushes. The Boeckh Bros. Co., Limited, Toronto, Ontario.
- 22,180. The word RINEX—general mechanical rubber goods such as belting, tires, hose, packing, soles and heels. Canadian Consolidated Rubber Co., Limited, Montreal, Quebec.

THE FRENCH REPUBLIC

- 24,335. Two hands stretching a band, the word NEVERRIP above and "LA VRAIE MANIÈRE D'ARRÊTER LES CHAUSSURES" below—sporting goods, and medical, surgical and toilet sundries. A. E. Fromont, 11 Madison avenue, New York, U. S. A.
- 24,336. Two hands stretching a band, the word NEVERRIP above and "LA VRAIE MANIÈRE D'ARRÊTER LES CHAUSSURES" below—sporting goods, and medical, surgical and toilet sundries. A. E. Fromont, 128 Gower street, London, England.
- 24,337. Two hands stretching a band, the word NEVERRIP above and "LA VRAIE MANIÈRE D'ARRÊTER LES CHAUSSURES" below—sporting goods, and medical, surgical and toilet sundries. A. E. Fromont, 128 Gower street, London, England.
- 24,353. A representation of a rhinoceros above a scroll bearing the word DERMATINE—rubber and rubber goods. Dermatine Co., Limited, 95 Neate street, Camberwell, London, England.

NEW ZEALAND.

- 12,959. An oval design with an illustration of a seal in the center, and forming a border around it the words DOMINION RUBBER CO., LIMITED—goods manufactured from india rubber and gutta percha. Canadian Consolidated Rubber Co., Limited, Notre Dame street, East, and Papineau avenue, Montreal, Quebec.
- 13,532. An oval design with an illustration of a seal in the center, and forming a border around it the words DOMINION RUBBER CO., LIMITED—clothing. Canadian Consolidated Rubber Co., Limited, Notre Dame street, East, and Papineau avenue, Montreal, Quebec.
- 13,414. The word USCO—pneumatic vehicle tires. United States Tire Co., 1790 Broadway, New York City, U. S. A.

AUSTRALIA.

- 19,233. The word DOMINION—india rubber and gutta percha goods. Canadian Consolidated Rubber Co., Limited, Montreal, Quebec, Canada.
- 20,722. The word DOMINION—articles of clothing. Canadian Consolidated Rubber Co., Limited, Montreal, Quebec, Canada.
- 20,752. An illustration of a bear standing on its hind legs, fore paws at back—india rubber and gutta percha goods. Perdrion Rubber Co., Limited, 270 George street, Sydney, N. S. W., Australia.

SPAIN.

- 28,703. The words CORREA DE BALATA "VINCITOR"—rubber belting. Gonzalez Erquicia & Co., Bilbao (Vizcaya).

SOCIETY OF AUTOMOTIVE ENGINEERS.

The Society of Automobile Engineers will change to the above name on the nineteenth of this month, after which time the engineers who were formerly members of the American Society of Aeronautic Engineers, the Society of Tractor Engineers, and engineers connected with the company members of the National Association of Engine and Bolt Manufacturers will be working together to further such standardization work as shall be feasible in their respective fields, and with the welfare of the nation at this time constantly in view. A preparedness committee is now in close touch with the government officials and securing information to render such assistance as is needed from the members of this Society. Arrangements are being made for the most elaborate meeting in its history, this summer, the announcement of time and place being withheld pending development of international conditions.

GERMANY EXPECTS TO RECOVER SOUTH AMERICAN RUBBER TRADE.

A writer in the "Vossische Zeitung" recently, while appreciating the greatly increased American, Japanese, Spanish and Swiss exports to South America since the outbreak of the war, reaffirms the belief that upon the coming of peace Germany can soon recover the greater part of her trade in many fields. "The market of the rubber factories," he states, "will meanwhile have passed into American and British hands, but in view of previous experiences the opinion is held that a great part of Germany's former customers will soon have resumed relations with her."

The Canadian Consolidated Rubber Co., Limited, Montreal, Canada, issue some excellent folders. A recent one, entitled, "Two Feet," is especially attractive in make-up, and convincing in argument.

Review of the Crude Rubber Market.

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NEW YORK

MARKET has been a comparatively quiet market in the crude rubber market, with trading devoted to routine business and the supplying of small manufacturers' requirements. The uncertainty regarding the effect of war with Germany has produced what appears to be a policy of watchful waiting on the part of the heavy buying interests. Moreover, trade has been seriously obstructed by local freight embargoes and the railroad disturbance that for a time threatened the country has affected business adversely. While the volume of rubber arrivals has been about normal during the month, the recent heavy requisitions of British bottoms together with the fact that our government has notified certain shipping companies that their ships may be required, will undoubtedly have an ultimate effect on future arrivals. The shipping situation it would seem is beset with difficulties that are apparently growing worse instead of better.

Generally speaking, the demand for crude rubber has been spasmodic, resulting in minor price fluctuations that show a decline since March 1 of about 5 cents in plantations and 2 to 4 cents on Para sorts. On March 1, First latex and Smoked sheet ribbed, spot were quoted 87 cents in a strong market, with July-December at 75 cents. Upriver fine, spot was quoted 80 cents. The market softened early in the month and prices became easier until the middle of the month when a strong undertone developed, resulting in a slight price advance. The heavy buying interests, however, failed to support the prevailing prices and the market became easier later. On March 29 First latex and Smoked sheet ribbed, spot were quoted 82½ to 83 cents and July-December arrivals 73 cents; Upriver fine was quoted 77 cents. There appears to be very little spot rubber available, and interest in futures has been confined to inquiries that were quite active during the last week of the month. The general market conditions were strong and prices firm.

CONGO

Early in the month there was a marked tendency to buy and much rubber changed hands despite the fact that spot supplies were not plentiful. The bullish interest, however, was arrested by the reports of considerable rubber afloat and prices became easier. On March 5 First latex and Smoked sheet ribbed, spot were quoted 77½ cents, the market being generally firm until later in the month when values became easier and prices declined. On March 27 First latex and Smoked sheet ribbed, spot were quoted 77½ cents. An unusual feature of the month has been the variation of prices in the three principal world markets. New York's highest figure was 87 cents, that of London was 80 cents and Singapore, 74 cents. This abnormal situation is undoubtedly due to the weak financial position and shipping difficulties surrounding the Eastern markets.

London imports for January were 6364 tons; Liverpool imports for the same period were 1215 tons. For December London imports were 5150 tons and for Liverpool 1771 tons. Reexports for January were as follows: London, 4473 tons; Liverpool 976 tons against London 2421 tons, and Liverpool 368 tons for December.

SINGAPORE

At the auctions held March 2, 10, 16 and 22 the average prices obtained were as follows: First latex crépe, 70.44 cents;

Smoked sheet, ribbed, 70.23 cents. The total amount sold was 1840 tons.

NEW YORK SPOT QUOTATIONS.

	April 1, 1917.	March 1, 1917.	March 29, 1917.
Latex			
First-latex crépe ..	87	86	82
At 100 lbs. 12 1/2% ..	78 1/2	78	78 1/2
At 100 lbs. 12 1/2% ..	82	82	78
Brown crépe, thin clean	80	80	77
Brown crépe, thin clean, light mottled.	82	82	78
Brown crépe, thin clean	80	80	77
Brown crépe, thin clean	79	79	75
Brown crépe, thin clean	77	77	72
Brown crépe, thin clean	65	65	65
Smoked sheet, ribbed standard quality.	86	86	82
Smoked sheet, plain standard quality...	80	80	80 1/2
Unsmoked sheet, standard quality.....	84	84	78 1/2
Singapore scrap, No. 1.....	63	63	63
Singapore scrap, No. 2.....	61	61	61
Colombo scrap, No. 1.....	64	64	64
Colombo scrap, No. 2.....	62	62	62
Plantation			
Upriver fine	80	80	77
Upriver fine	75	75	72 1/2
Upriver fine	57	57	54 1/2
Upriver fine	88	88	82
Upriver fine	68	68	65
Upriver fine	54 1/2	54 1/2	50
Upriver fine	70	70	70
Upriver fine	60	60	60
Upriver fine	38	38	36
Upriver fine	64	64	54
Upriver fine	38	38	38
Lower caucho ball	48	48	48
Peruvian fine	78	78	74
Peruvian fine	74	74	74
Smoked			
At 100 lbs. 12 1/2% ..	34	34	34
Benguela, extra seconds, 28% ..	40 1/2	40 1/2	40 1/2
At 100 lbs. 12 1/2% ..	30	30	30
At 100 lbs. 12 1/2% ..	23 1/2	23 1/2	23 1/2
Congo prime, black upper	60	60	60
Congo prime, black upper	60	60	60
Congo prime, black upper	60	60	60
Congo prime, black upper	66	66	64
Congo prime, black upper	66	66	67
Congo prime, black upper	63	63	63
CENTRAL			
At 100 lbs. 12 1/2% ..	51	51	50
At 100 lbs. 12 1/2% ..	40	40	40
Central scrap and strip.....	48	48	48
Central scrap and strip.....	35	35	35
Central scrap and strip.....	50	50	50
MANUFACTURED			
Ceara sheet	35	35	35
Ceara negro heads	40	40	40
Manila sheet	28	28	28
Manila extra	35	35	35
Manila for reekels	32	32	32
Manila for reekels	38	38	38
Mangabeira thick sheet	36	36	36
ESTATE			
Barroto block	68	68	68
Surinam sheet	68	68	68
INDONESIA			
At 100 lbs. 12 1/2% ..	70	70	70
At 100 lbs. 12 1/2% ..	73	73	73
Penang block scrap.....	35	35	35
Penang block scrap.....	25	25	25
Barroto sheet	12	12	20
Gutta percha, red Macassar.	70	70	70

COMPARATIVE NEW YORK PRICES FOR MARCH.

In regard to the financial situation, Albert B. Beers (broker in crude rubber and commercial paper, No. 68 William street, New York) advises as follows:

The demand for commercial paper has been steady throughout March, the best rubber names selling at 4½@4¼ per cent, and those not so well known 5@5½ per cent. The demand from our city banks has been rather light.

Upriver, fine	1915
Upriver, coarse	1915
Islands, fine	1915
Islands, coarse	1915
Cameta	1915

*Figured only to March 27.

MARKET CABLE SERVICE FROM LONDON

The following market report has been cabled from Aldens' Successors, Limited, London.

Date.	Standard Crêpe.	Sheet.	Market.
February 26	72.25	73.10	Buyers
March 5	72.25	73.10	Buyers
March 12	69.70	68.42	Buyers
March 19	69.70	68.42	Buyers
March 26	67.87	65.45	Buyers

MARKET CABLE SERVICE FROM SINGAPORE.

The following reports of the weekly auctions held at Singapore have been cabled by The Waterhouse Co., Limited:

Date.	Crêpe Price per lb.	Smoked Sheet Price per lb.	Tons Sold	Market
March 2	72.25	73.10	510	There is a large demand for better grades.
March 10	73.97	73.95	583	There is a large demand for better grades.
March 16	69.70	68.42	583	Market dull and declining.
March 23	67.87	65.45	362	There is less demand.

WEEKLY RUBBER REPORT.

GUTHRIE & CO. LIMITED, SINGAPORE.

For the weekly rubber auction held yesterday and today the quantity cataloged was 750 tons, of which 440 tons changed hands. A steady demand was experienced, and prices show an all round improvement of approximately \$5 per picul as compared with last week's auction. The top price paid for fine ribbed smoked sheet was \$146 per picul, being \$4 above last week's best. For fine pale crêpe the top price was \$147 per picul, an advance of \$6. There was a fair demand for unsmoked sheet, for the first time for some weeks. Brown crêpes were again readily taken up at good prices. For dark crêpes and lower grades there was a good inquiry, at considerably improved prices.

The following was the course of values:

	In Singapore per picul.*	Sterling equivalent per pound in London.	Equivalent per pound
Sheet, good ribbed smoked....	123@ 138	59.07@72.05	52.27@58.65
Sheet, plain smoked.....	110@ 128	46.75@54.40	47.17@53.97
Crêpe, fine pale.....	136@ 147	57.80@62.47	55.25@59.07
Crêpe, good pale.....	131@ 139	53.12@55.67	41.65@52.27
Crêpe, fine brown.....	131	41.65@52.27	29.75@38.67
Crêpe, good brown.....	94	22.95@40.80	
Crêpe, dark.....			
Scrap, pressed.....			

*Picul = 33.33 pounds.

Quoted in S. S. dollars = 2/4, [56.7 cents].

CENTRALS.

	Pounds.
FEBRUARY 26.—By the <i>Santiago</i> =Guayaquil:	
Andean Trading Co.....	6,000
Columbia Oversea Corporation.....	3,200
Various.....	1,400
FEBRUARY 26.—By the <i>Santiago</i> =Cartagena:	
G. Amsinck & Co.....	5,700
Pablo Calvet & Co.....	2,300
FEBRUARY 26.—By the <i>Tivies</i> =Puerto Cortés:	
Eggers & Heinlein.....	900
FEBRUARY 26.—By the <i>Tivies</i> =Puerto Cortés:	
I. S. Sembrada & Co.....	3,400
W. R. Grace & Co.....	1,400
FEBRUARY 26.—By the <i>Tivies</i> =Puerto Cortés:	
Cuba:	
Neuss, Hesslein & Co.....	200
FEBRUARY 28.—By the <i>Allianza</i> =Cristobal:	
I. S. Sembrada & Co.....	3,400
Pablo Calvet & Co.....	9,400
FEBRUARY 28.—By the <i>Allianza</i> =Panama:	
Piza, Nephews & Co.....	2,000

CRUDE RUBBER ARRIVALS AT THE PORT OF NEW YORK.

The following statistics are not complete due to reports from the Treasury Department.

PARAS FROM BRAZIL.

MARCH 1.—By the steamer *Cristobal* from Cristobal:

	Fine.	Medium.	Coarse.	Cauchó.	Totals.
G. Amsinck & Co.....	7,600	04,100	1,800	12,000	72,300
Gaston, Williams & Wigmore.....					2,200
Goldsmith & Co.....					20,200
A. Vogel & Co.....					5,800

MARCH 3.—By the steamer *Acre* from Para:

	Fine.	Medium.	Coarse.	Cauchó.	Totals.
Muller, Schall & Co.....	7,600	04,100	1,800	12,000	308,300
Neuss, Hesslein & Co.....	24,000		16,200	12,000	124,800
Arnold & Zeiss.....	49,900		1,800		52,200
G. Amsinck & Co.....	50,800				51,700
A. D. Strauss & Co.....	19,500				50,800
W. R. Grace & Co.....	82,400	37,400	59,400	18,500	19,500
Various.....					197,700
Totals.....	258,300	342,200	162,000	61,500	824,000

MARCH 8.—By the steamer *Stephen* from Manaos:

	Totals.
General Rubber Co.....	123,500
Arnold & Zeiss.....	132,600
W. R. Grace & Co.....	148,800
J. H. Schroeder & Co.....	148,800
Goldman, Sachs & Co.....	999,400
Heidelbach & Ickelheimer.....	2,057,700

MARCH 8.—By the steamer *Stephen* from Itacoatiara:

	Totals.
H. A. Astlett.....	136,300
Henderson & Korn.....	286,600
Arnold & Zeiss.....	45,000
G. Amsinck & Co.....	13,000
Lazard Freres.....	605,600
Truhling & Goshen.....	3,355,000

MARCH 12.—By the steamer *Minas Geraes* from Para:

	Pounds.
Aldens' Successors, Ltd.....	28,300
H. A. Astlett & Co.....	136,300
Muller, Schall & Co.....	286,600
G. Amsinck & Co.....	45,000
Arnold & Zeiss.....	13,000
W. R. Grace & Co.....	605,600
Goldman, Sachs & Co.....	
E. T. Greiner.....	

POUNDS.

	Pounds.
Mecke & Co.....	500
G. A. Amsinck & Co.....	900
Various.....	1,500
American Trading Co.....	100
Various.....	1,200
March 2.—By the <i>Carrillo</i> =Puerto Columbia:	
G. Amsinck & Co.....	5,200
March 3.—By the <i>Fagernacs</i> =Colombo:	
Aldens' Successors, Ltd.....	11,200
Various.....	91,400
March 6.—By the <i>Danube</i> =Cartagena:	
G. Amsinck & Co.....	26,000
March 7.—By the <i>Colon</i> =Cristobal:	
G. Amsinck & Co.....	1,000
Isaac Brandon & Bros.....	600
United Fruit Co.....	400
March 7.—By the <i>Colon</i> =Cristobal:	
G. Amsinck & Co.....	27,700

POUNDS.

	Pounds.
Gontard & Co.....	400
H. W. Peabody & Co.....	2,200
W. Louiza & Co. of New York.....	200
Charles Griffin & Co.....	8,800
Pablo Calvet & Co.....	18,700
Dumarest Bros. & Co.....	3,000
March 7.—By the <i>Colon</i> =Panama:	
Fidanque Bros. & Co.....	2,800
Otto Gerdaud & Co.....	5,000
Piza, Nephews & Co.....	400
March 9.—By the <i>Santa Marta</i> =Cartagena:	
Muller, Schall & Co.....	2,800
March 12.—By the <i>Sixiola</i> =Puerto Cortez:	
G. Amsinck & Co.....	200
Eggers & Heinlein.....	300
J. S. Sembrada & Co.....	3,700
Isaac Brandon & Bros.....	700

AFRICANS.

POUNDS.

Rubber Trading Co.....	71,680	
United States Rubber Co.....	57,200	
The Goodyear Tire & Rubber Co.	182,300	
Winter, Son & Co.....	42,200	493,246
Alders' Successors, Ltd.....	44,800	
Various	204,900	249,700

Alders' Successors, Ltd.....	801,500	
L. Littlejohn & Co.....	153,200	
United States Rubber Co.....	110,400	
Raw Products Co.....	11,162	1,076,262

MARCH 12.—By the *Mississippi*=London:

Raw Products Co.....	18,062	
United States Rubber Co.....	89,300	
L. Littlejohn & Co.....	121,400	
Goodyear Tire & Rubber Co.....	39,900	
Meyer & Brown.....	34,500	
Fred Stern & Co.....	56,100	
Robinson & Co.....	10,300	
Various	18,700	388,362

MARCH 12.—By the *St. George*=London:

Michelin Tire Co.....	37,100	
Hagemeyer Trading Co.....	51,359	
Rubber Trading Co.....	33,600	
L. Littlejohn & Co.....	116,500	
Raw Products Co.....	22,279	
United States Rubber Co.....	120,200	
J. T. Johnstone & Co.....	141,700	
Edward Maurer & Co.....	77,000	
Arnold & Zeiss.....	143,200	
Meyer & Brown.....	92,800	
Johnston & Co.....	4,500	
Robert Badenhop Co., Inc.....	14,900	
Various	215,400	1,070,538

MARCH 12.—By the *Savona*=London:

Alders' Successors, Ltd.....	192,500	
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MARCH 19.—By the *Pannonia*=London:

Alders' Successors, Ltd.....	33,500	
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BALATA.

FEBRUARY 8.—By the *Illiana*=Cristobal:

J. S. Sembrada & Co.....	2,900	
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FEBRUARY 28.—By the *Allianca*=Panama:

Piza, Nephews & Co.....	400	
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FEBRUARY 8.—By the *Phonix*=Colon:

Gontard & Co.....	4,800	
Pottberg, Ebeling & Co.....	2,900	
Franklin Baker & Co.....	2,900	
Various	300	13,800

MARCH 1.—By the *Ision*=Hongkong:

G. Amsinck & Co.....	900	
Gaston, Williams & Wigmore.....	7,300	
Mecke & Co.....	800	8,000

MARCH 5.—By the *Maracaibo*=Curacao:

G. Amsinck & Co.....	118,910	
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MARCH 7.—By the *Parana*=Cristobal:

Various	13,800	
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MARCH 1.—By the *Sado Maru*=Yokohama:

L. Littlejohn & Co.....	13,800	
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MARCH 1.—By the *Canada Maru*=Yokohama:

Various	13,800	
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MARCH 1.—By the *Avi Maru*=Yokohama:

Various	13,800	
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MARCH 1.—By the *Avi Maru*=Yokohama:

Various	13,800	
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MARCH 1.—By the *Avi Maru*=Yokohama:

Various	13,800	
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MARCH 1.—By the *Avi Maru*=Yokohama:

Various	13,800	
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MARCH 1.—By the *Avi Maru*=Yokohama:

Various	13,800	
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MARCH 1.—By the *Avi Maru*=Yokohama:

Various	13,800	
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MARCH 1.—By the *Avi Maru*=Yokohama:

Various	13,800	
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MARCH 1.—By the *Avi Maru*=Yokohama:

Various	13,800	
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MARCH 1.—By the *Avi Maru*=Yokohama:

Various	13,800	
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MARCH 1.—By the *Avi Maru*=Yokohama:

Various	13,800	
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MARCH 1.—By the *Avi Maru*=Yokohama:

Various	13,800	
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MARCH 1.—By the *Avi Maru*=Yokohama:

Various	13,800	
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MARCH 1.—By the *Avi Maru*=Yokohama:

Various	13,800	
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MANICOBAS.

FEBRUARY 4.—By the *Penang*=Penang:

Various	126,900	264,100
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MARCH 12.—By the *Spenser*=Bahia:

Various	51,000	
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MARCH 12.—By the *Minas Geraes*=Pernambuco:

Various	28,100	
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MARCH 12.—By the *Minas Geraes*=Pernambuco:

Various	21,500	
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PLANTATIONS.

FEBRUARY 4.—By the *Penang*=Penang:

L. Littlejohn & Co.....	472,300	
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Hood Rubber Co.....

Henderson & Korn.....	171,800	
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L. T. Johnstone & Co.....

Charles T. Wilson Co., Inc.....	124,700	
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Alders' Successors, Ltd.....

Rubber Trading Co.....	17,680	
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Goodyear Tire & Rubber Co.....

Hagemeyer Trading Co.....	8,960	
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Arnold & Zeiss.....

Wm. H. Stiles.....	33,400	
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Fred Stern & Co.....

Robinson & Co.....	137,500	
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W. R. Grace & Co.....

Edward Maurer & Co.....	31,900	
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East Asiatic Co.....

Arthur Meyer & Co.....	157,500	
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Mexican Crude Oil & Asphalt

Products Co.....	23,700	
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Robert Badenhop Co., Inc.....

L. B. R. & Co.....	14,000	
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Goldman, Sachs & Co.....

Various	21,600	1,837,140
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FEBRUARY 24.—By the *Port Del*=Port Del:

L. Littlejohn & Co.....	27,000	
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Henderson & Korn.....

Charles T. Wilson Co., Inc.....	4,000	
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Robinson & Co.....

Fred Stern & Co.....	1,400	
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East Asiatic Co.....

Arthur Meyer & Co.....	1,300	98,700
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FEBRUARY 26.—By the *Francisco*=Hull:

Robert Badenhop Co., Inc.....	15,100	
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FEBRUARY 26.—By the *Francisco*=Hull:

Various	15,100	
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FEBRUARY 26.—By the *Francisco*=Hull:

Various	15,100	
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FEBRUARY 26.—By the *Francisco*=Hull:

Various	15,100	
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FEBRUARY 26.—By the *Francisco*=Hull:

Various	15,100	
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FEBRUARY 26.—By the *Francisco*=Hull:

Various	15,100	
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FEBRUARY 26.—By the *Francisco*=Hull:

Various	15,100	
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FEBRUARY 26.—By the *Francisco*=Hull:

Various	15,100	
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FEBRUARY 26.—By the *Francisco*=Hull:

Various	15,100	
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FEBRUARY 26.—By the *Francisco*=Hull:

Various	15,100	
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Various	15,100	
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FEBRUARY 26.—By the *Francisco*=Hull:

Various	15,100	
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FEBRUARY 26.—By the *Francisco*=Hull:

Various	15,100	
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FEBRUARY 26.—By the *Francisco*=Hull:

Various	15,100	
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FEBRUARY 26.—By the *Francisco*=Hull:

Various	15,100	
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MARCH 6.—By the *Nigretia*=Havre:

The Loewenthal Co.....	103,200	
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Leopold Lazarus Co.....

Various	6,400	138,200
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MARCH 7.—By the *Saratoga*=Havana:

Yglesias & Co.....	8,200	
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Gontard & Co.....

Various	2,400	10,600
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MARCH 9.—By the *Matura*=Paramaribo:

Boos & Co.....	100	
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MARCH 9.—By the *Minnehaha*=London:

H. Muehlstein & Co.....	45,700	
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Various

Various	18,800	64,500
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MARCH 12.—By the *Port Napier*=London:

H. Muehlstein & Co.....	73,900	
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Various

Various	252,600	326,500
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MARCH 12.—By the *St. George*=London:

H. Muehlstein & Co.....	22,800	
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Various

Various	12,300	35,100
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MARCH 13.—By the *Metapan*=Havana:

United States Rubber Export Co.....	1,400	
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MARCH 13.—By the *Metapan*=Havana:

United States Rubber Export Co.....	1,400	
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MARCH 13.—By the *Metapan*=Havana:

United States Rubber Export Co.....	1,400	
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MARCH 13.—By the *Metapan*=Havana:

United States Rubber Export Co.....	1,400	
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MARCH 13.—By the *Metapan*=Havana:

United States Rubber Export Co.....	1,400	
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MARCH 13.—By the *Metapan*=Havana:

United States Rubber Export Co.....	1,400	
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MARCH 13.—By the *Metapan*=Havana:

United States Rubber Export Co.....	1,400	
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MARCH 13.—By the *Metapan*=Havana:

United States Rubber Export Co.....	1,400	
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MARCH 13.—By the *Metapan*=Havana:

United States Rubber Export Co.....	1,400	
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MARCH 13.—By the *Metapan*=Havana:

United States Rubber Export Co.....	1,400	
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MARCH 13.—By the *Metapan*=Havana:

United States Rubber Export Co.....	1,400	
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MARCH 13.—By the *Metapan*=Havana:

United States Rubber Export Co.....	1,400	
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MARCH 13.—By the *Metapan*=Havana:

United States Rubber Export Co.....	1,400	
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MARCH 13.—By the *Metapan*=Havana:

United States Rubber Export Co.....	1,400	
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MARCH 13.—By the *Metapan*=Havana:

United States Rubber Export Co.....	1,400	
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MARCH 13.—By the *Metapan*=Havana:

United States Rubber Export Co.....	1,400	
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MARCH 13.—By the *Metapan*=Havana:

United States Rubber Export Co.....	1,400	
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MARCH 13.—By the *Metapan*=Havana:

United States Rubber Export Co.....	1,400	
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MARCH 13.—By the *Metapan*=Havana:

United States Rubber Export Co.....	1,400	
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MARCH 13.—By the *Metapan*=Havana:

United States Rubber Export Co.....	1,400	
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MARCH 13.—By the *Metapan*=Havana:

United States Rubber Export Co.....	1,400	
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MARCH 13.—By the *Metapan*=Havana:

United States Rubber Export Co.....	1,400	
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MARCH 13.—By the *Metapan*=Havana:

United States Rubber Export Co.....	1,400	
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MARCH 13.—By the *Metapan*=Havana:

PORT OF CHATELAIN—FEBRUARY, 1917.	POUNDS.	VALUE.
IMPORTS:		
India rubber	84,965	\$44,683
Rubber scrap	399	7
Totals	85,364	\$44,683

PORT OF BOSTON—JANUARY, 1917.	POUNDS.	VALUE.
IMPORTS:		
India rubber	146,967	21,693
Gutta jelutong (Pontianak)	498,374	6,740
Rubber scrap	164,684	778
Manufactures of india rubber		
Totals	800,311	\$86,802

EXPORTS:		
India rubber boots....pairs	48,565	\$10,002
India rubber shoes....pairs	103,252	60,453
Automobile tires		729
Belting, hose, etc.		1,122
All other manufactures of india rubber		9,663
Total		\$173,319

PORT OF BOSTON—FEBRUARY, 1917.	POUNDS.	VALUE.
IMPORTS:		
India rubber	31,776	\$15,970
Gutta jelutong (Pontianak)	1,306	8,958
Rubber scrap	151,381	4,768
Manufactures of india rubber		1,556
Totals	365,724	\$31,251

EXPORTS:		
Rubber scrap	20,337	\$1,188
India rubber boots....pairs	31,285	6,593
India rubber shoes....pairs	123,659	6,688
Automobile tires		1,076
Other rubber tires		158
Belting, hose, etc.		6,876
All other manufactures of india rubber		11,659
Total		\$31,251

DISTRICT OF MICHIGAN—JANUARY, 1917.	POUNDS.	VALUE.
IMPORTS:		
Rubber scrap	3,617	\$3,478
Manufactures of india rubber		
Totals	3,615	\$3,478

EXPORTS:		
Rubber scrap	108,421	\$9,006
India rubber boots....pairs	6,392	15,984
India rubber shoes....pairs	14	18
Automobile tires		5,255
Other rubber tires		28
Belting, hose, etc.		1,406
All other manufactures of india rubber		4,578
Total		\$36,479

DISTRICT OF MICHIGAN—FEBRUARY, 1917.	POUNDS.	VALUE.
IMPORTS:		
Manufactures of india rubber		\$6,211
EXPORTS:		
India rubber boots....pairs	1,205	\$3,876
India rubber shoes....pairs	32	56
Automobile tires		7,689
Other rubber tires		25
Belting, hose, etc.		679
All other manufactures of india rubber		4,524
Total		\$36,803

PORT OF NEW YORK—FEBRUARY, 1917.	POUNDS.	VALUE.
IMPORTS:		
India rubber	15,468,856	\$8,293,212
Rubber scrap	2,348,484	103,307
Gutta percha	3,465	3,489
Gutta jelutong (Pontianak)	1,336,535	57,373
Manufactures of india rubber		44,579
Totals	17,051,243	\$8,501,960

EXPORTS:		
Rubber scrap, imported....	135,238	\$74,309
Rubber scrap, exported....lbs.	1,130,259	82,640
Reclaimed rubber	210,329	29,313
India rubber boots....pairs	6,749	1,115
India rubber shoes....pairs	1,959	4,864
Automobile tires	94,092	51,500
Other rubber tires	482,170	123,363
Belting, hose, etc.	123,363	176,930
All other manufactures of india rubber		464,369
Total		\$1,490,573

PORT OF NEW ORLEANS—JANUARY, 1917.	POUNDS.	VALUE.
IMPORTS:		
India rubber	50,008	\$8,081

PORT OF NEW ORLEANS—FEBRUARY, 1917.	POUNDS.	VALUE.
IMPORTS:		
India rubber	8,760	\$37,405

PORT OF SAN FRANCISCO—JANUARY, 1917.	POUNDS.	VALUE.
IMPORTS:		
India rubber	1,862,768	\$1,106,861
Manufactures of india rubber		499
Totals	1,862,768	\$1,106,861

EXPORTS:		
India rubber boots....pairs	300	\$10,163
India rubber shoes....pairs	36,897	1,860
Automobile tires		24,969
Other rubber tires		205,058
Belting, hose, etc.		31,507
All other manufactures of india rubber		27,051
Total	37,197	\$325,834

PORT OF PHILADELPHIA—FEBRUARY, 1917.	POUNDS.	VALUE.
IMPORTS:		
Automobile tires		\$100,919
All other manufactures of india rubber		641
Total		\$101,560

PORT OF PHILADELPHIA—FEBRUARY, 1917.	POUNDS.	VALUE.
EXPORTS:		
Automobile tires		\$68,939
All other manufactures of india rubber		65
Total		\$68,939

PORT OF SAN FRANCISCO—FEBRUARY, 1917.	POUNDS.	VALUE.
IMPORTS:		
India rubber	2,319,903	\$1,373,887
EXPORTS:		
India rubber boots....pairs	1,060	\$6,622
India rubber shoes....pairs	1,750	1,205
Automobile tires		98,480
Other rubber tires		11,760
Belting, hose, etc.		6,607
All other manufactures of india rubber		6,134
Total	2,810	\$134,613

PORT OF SEATTLE AND TACOMA—JANUARY, 1917.	POUNDS.	VALUE.
IMPORTS:		
India rubber	4,113,109	\$2,103,095
Manufactures of india rubber		17
Totals	4,113,109	\$2,103,112

EXPORTS:		
India rubber boots....pairs	511	\$1,265
India rubber shoes....pairs	676	934
Automobile tires		3,200
Other rubber tires		387
Belting, hose, etc.		9,741
All other manufactures of india rubber		12,008
Totals	998	\$27,535

PORT OF SEATTLE AND TACOMA—FEBRUARY, 1917.	POUNDS.	VALUE.
IMPORTS:		
India rubber	1,261,530	\$807,442
Manufactures of india rubber		25
Totals	1,261,530	\$807,467

EXPORTS:		
India rubber boots....pairs	511	\$1,668
India rubber shoes....pairs	1,300	1,373
Automobile tires		41,258
Other rubber tires		899
Belting, hose, etc.		6,306
All other manufactures of india rubber		3,364
Totals	1,811	\$54,868

RUBBER STATISTICS FOR THE UNITED STATES.

IMPORTS OF CRUDE AND MANUFACTURED RUBBER.

January, 1917.	Pounds.	Value.
Unmanufactured		
India rubber:		
From—		
France	99,381	\$54,329
Portugal	181,689	71,962
United Kingdom	7,456,359	4,723,797
Central American States and British Honduras	148,319	69,423
Mexico	13,188	76,066
Brazil	4,924,023	2,356,592
Other South America	1,424,207	708,275
East Indies	21,647,115	11,291,612
Other countries	7,506	3,224
Totals	36,101,787	\$19,349,310

	POUNDS.	VALUE.
Guayule gum	310,677	150,864
*Gutta jelutong	52,402	11,837
Gutta percha	3,419,835	149,168
	378,241	26,521

Totals	40,262,942	\$19,687,700
Rubber scrap	1,951,049	141,622

Totals, unmanufactured	42,213,991	\$19,829,322
Chicle	497,411	242,263

Manufactured dutiable:		
Gutta percha		6,014
India rubber		31,636
Total		\$7,650

EXPORTS OF DOMESTIC MERCHANDISE.	January, 1917.
Pounds.	Value

Automobile tires		
France		\$58,157
Rubber boots		16,134
United Kingdom		456,001
Central American States		108,226
Mexico		645
Canada		64,563
Argentina		41,190
Netherlands		60,493
Highway tires		36,888
Other countries		468,522
Total		\$1,328,819

Belting, hose and packing		726,305
Rubber boots		292,650
Rubber shoes		172,602
Rubber tires		307,883
Rubber goods		167,692
Rubber scrap		286,468
Rubber goods		22,285
Rubber goods		69,257
Rubber goods		439,186
Totals, unmanufactured		\$3,519,911

EXPORTS OF FOREIGN MERCHANDISE.

January, 1917.	Pounds.	Value.
Unmanufactured		
Belting, hose and packing		726,305
Rubber boots		292,650
Rubber shoes		172,602
Rubber tires		307,883
Rubber goods		167,692
Rubber scrap		286,468
Rubber goods		22,285
Rubber goods		69,257
Rubber goods		439,186
Totals, unmanufactured		\$3,519,911

EXPORTS OF RUBBER GOODS TO NON-CONTIGUOUS TERRITORIES OF THE UNITED STATES.

January, 1917.	Pounds.	Value.
Unmanufactured		
Belting, hose and packing		\$7,823
Rubber boots		1,172
Other rubber goods		1,172
Total		\$17,278

EXPORTS OF RUBBER GOODS TO NON-CONTIGUOUS TERRITORIES OF THE UNITED STATES.

January, 1917.	Pounds.	Value.
Unmanufactured		
Belting, hose and packing		\$7,823
Rubber boots		1,172
Other rubber goods		1,172
Total		\$17,278

Belting, hose and packing		\$10,495
Automobile tires		119,798
Other tires		1,334
Other rubber goods		16,307
Total		\$157,634

Belting, hose and packing		\$6,927
Rubber boots		37,377
Tires		37,336
Other rubber goods		9,366
Total		\$91,106

Belting, hose and packing		\$6,927
Rubber boots		37,377
Tires		37,336
Other rubber goods		9,366
Total		\$91,106

Belting, hose and packing		\$6,927
Rubber boots		37,377
Tires		37,336
Other rubber goods		9,366
Total		\$91,106

* Dutiable beginning July 1, 1916.

MONTHLY IMPORTATIONS OF RUBBER TO THE UNITED STATES FOR THE LAST SIX YEARS (In Tons).

Plantation Ceylon—	Jan.	Feb.	March.	April.	May.	June.	July.	August.	Sept.	Oct.	Nov.	Dec.	Total.
1911.....	334	417	616	518	688	489	460	470	614	697	551	697	6,556
1912.....	866	976	986	1,286	1,750	676	849	923	1,153	1,568	1,735	2,235	15,003
1913.....	1,611	1,558	1,978	1,783	1,801	1,700	1,728	1,979	2,534	2,214	2,373	2,708	23,967
1914.....	2,165	2,782	3,329	4,407	4,105	2,493	2,204	2,032	3,989	3,360	2,327	2,133	35,326
1915.....	410	3,865	5,205	7,166	4,443	6,319	5,260	5,311	5,330	6,665	3,750	7,361	61,085
1916.....	6,825	6,272	7,287	6,625	8,421	9,103	5,418	5,326	6,150	6,948	7,341	9,571	85,287
Fin. Para—													
1911.....	896	701	638	382	498	1,105	795	754	925	1,498	1,376	1,250	10,818
1912.....	1,728	1,657	1,304	1,240	676	767	701	844	876	1,056	1,105	1,241	13,185
1913.....	1,334	1,380	899	749	499	665	452	566	757	877	1,120	774	10,072
1914.....	707	623	1,282	784	862	525	469	610	963	1,146	1,100	836	10,107
1915.....	1,521	638	1,799	418	807	393	624	455	1,243	781	1,372	1,604	11,658
1916.....	813	1,252	1,206	1,274	879	1,239	667	293	1,465	448	1,853	1,227	12,598
Coarse Para—													
1911.....	479	469	384	326	413	436	370	421	432	421	499	444	5,074
1912.....	677	641	756	516	438	537	375	469	427	356	469	415	6,056
1913.....	606	665	456	428	406	403	437	404	391	270	468	413	5,257
1914.....	192	341	754	432	599	304	420	182	364	362	418	485	5,153
1915.....	432	48	1,047	320	598	340	488	107	430	421	725	562	6,018
1916.....	498	555	446	761	558	438	334	78	465	84	649	553	5,349
Cauchos—													
1911.....	52	4	10	183	259	143	236	193	91	115	104	88	1,825
1912.....	77	15	391	359	306	130	213	183	213	221	327	277	2,776
1913.....	226	250	185	280	383	491	398	231	258	140	273	87	3,152
1914.....	188	107	625	858	744	299	365	185	337	148	188	169	4,206
1915.....	137	2	1,111	246	356	306	463	449	275	27	329	219	4,341
1916.....	302	411	363	687	732	555	272	281	221	20	276	323	4,443
Other Grades—													
1911.....	642	615	1,398	889	897	682	750	843	1,176	1,238	608	1,079	10,815
1912.....	1,366	1,777	1,786	1,864	900	697	645	921	1,019	807	645	988	13,031
1913.....	1,116	887	342	558	635	428	484	371	328	397	292	532	6,276
1914.....	247	675	515	603	644	81	211	215	415	336	366	581	5,084
1915.....	776	806	780	447	642	671	597	133	33	33	451	731	7,068
1916.....	737	1,088	630	596	471	699	225	290	374	317	683	594	6,831

HIGHEST AND LOWEST RATES PER POUND IN UNITED STATES CURRENCY.

First Lat. —	Jan.	Feb.	March	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1911.....	118@130	126@128	128@137	120@132	116@121	116@121	112@123	129@135	125@135	112@123	110@116	115@120
1912.....	103@111	96@103	88@96	76@88	78@84	70@77	117@123	117@120	109@120	100@108	100@106	106@111
1913.....	55@61	58@64	58@65	64@72	57@65	54@57	66@70	66@70	52@64	50@52	52@60	53@55
1914.....	59@64	57@63	59@60	59@60	59@61	59@63	62@63	59@61	57@58	61@63	63@78	76@99
1916.....	70@103	72@90	83@88	74@82	61@74	56@62	52@57	53@56	53@60	56@60	60@69	68@82
Upriver Fine—												
1911.....	112@128	125@166	136@167	115@141	95@129	85@114	99@116	109@116	111@119	100@111	100@104	102@108
1912.....	103@112	108@110	110@122	110@118	108@111	107@112	111@117	116@121	111@121	103@111	101@108	106@111
1913.....	102@110	96@102	88@96	77@88	82@91	86@89	83@92	83@93	77@88	72@78	73@78	71@74
1914.....	73@77	73@78	73@74	73@74	69@74	68@69	68@73	75@115	64@78	64@66	63@71	70@76
1915.....	61@75	57@61	58@60	57@60	59@61	61@63	59@63	56@59	55@57	55@57	57@76	68@87
1916.....	77@99	73@80	74@78	72@74	67@72	63@68	63@68	65@68	69@74	71@80	79@83	78@81
Upriver Coarse—												
1911.....	87@94	93@117	108@118	85@105	79@93	79@84	81@96	94@98	95@98	88@95	88@90	88@92
1912.....	90@94	92@94	94@96	92@96	87@92	84@91	89@96	87@95	80@86	79@84	79@84	81@82
1913.....	76@84	72@78	63@72	52@66	55@61	54@62	50@56	50@53	48@52	46@49	44@49	44@47
1914.....	44@47	44@47	43@46	43@47	41@46	38@42	38@42	43@49	43@53	43@47	46@53	51@60
1915.....	45@58	44@48	45@47	46@48	45@46	45@47	44@47	42@44	41@43	42@45	44@42	57@72
1916.....	60@76	53@60	56@59	55@57	50@54	42@50	41@42	39@40	41@44	42@46	45@47	47@56

TOTAL IMPORTS INTO THE UNITED STATES.

STOCKS IN THE UNITED STATES AND EUROPE (In Tons).

TOTAL EXPORTS FROM PARA.		(In Tons).		Stocks in the United States.		Total Stock, All Grades.	
Para Weights.	Para Grades.	Plant. Ceylon.	Other Grades.	Para Grades.	Exclusive of Plantations.	Stock, Europe.	Exclusive of Plantations.
1911.....	33,936	15,892	1,825	6,556	10,815	8,091	167,305
1912.....	43,467	19,241	2,776	15,003	13,031	6,105	21,000
1913.....	39,223	15,329	3,152	23,967	6,276	2,756	81,043
1914.....	37,215	15,260	4,206	35,326	5,084	850	57,722
1915.....	37,703	17,676	4,341	61,085	7,068	2,654	29,925
1916.....	39,200	17,947	4,443	85,287	6,831	435	2,140
Grand Total		135,535,954	7,167,346	30,643,565	3,676,520	177,476,985	379,533

PLANTATION RUBBER FROM THE FAR EAST.

TOTAL EXPORTS FROM MALAYA.

(From January 1, 1916, to dates named, excluding all foreign transshipments. Reported by Barlow & Co., Singapore.)

To	Singapore.	Malacca.	Penang.	Port Swettenham.	Totals.
	31, 1916.	31, 1916.	31, 1916.	27, 1917.	
United Kingdom.....	33,475,389	7,167,346	21,460,298	2,966,128	65,069,161
The Continent.....	12,144,475				12,200,829
Japan.....	4,469,493				4,469,493
Ceylon.....	656,942		563,600	87,368	1,307,910
United States.....	84,194,760		9,126,704	523,024	94,144,488
Australia.....	104				295,104
Totals.....	135,535,954	7,167,346	30,643,565	3,676,520	177,476,985

Same period, 1915.....	86,067,657	7,898,984	28,580,663	2,529,553	125,076,857
Same period, 1914.....	43,834,177	5,318,379	21,912,567	3,188,608	74,252,731
Same period, 1913.....	27,857,983		16,042,267	2,594,807	46,495,057

FEDERATED MALAY STATES EXPORTS.

As shown in the table, the total exports of rubber from the Federated Malay States in the month of February as 7,255 tons against 5,995 tons in January last and 5,207 tons in the corresponding period last year. Following are the comparative figures for three years:

	1915.	1916.	1917.
January.....	3,473	4,471	5,995
February.....	3,411	5,207	7,255

6,884 13,250

IMPORTS AND EXPORTS OF RAW RUBBER AT CEYLON

IMPORTS.

From January 1 to 29, 1917.

	Straits Settlements.	India.	Burma.	Totals.
Para Grades.....	167,305			167,305
Other Grades.....	21,000			21,000
Tuticorin.....	81,043			81,043
Alibon.....	57,722			57,722
Chennai.....	29,925			29,925
Madras.....	2,140			2,140
Port of Spain.....	626			626
Port of Spain.....	19,772			19,772
Totals.....	379,533			379,533

EXPORTS

	North America.	South America.	Europe.	Totals.
Seattle.....	33,600			33,600
San Francisco.....				
London.....		1,937,663		1,937,663
Manchester.....		5,568		5,568
Madras.....		536,620		536,620
Yokohama.....				
Shanghai.....				
Singapore.....				
Totals.....	33,600	1,937,663	5,568	1,976,731

1,444,687 2,479,851

EXPORTS OF CEYLON GROWN RUBBER.

France	332,200	293,674
Russia	908,697	571,236
Victoria		

The figures for 1915 and 1916 are for Ceylon rubber only.

Total Export from January 1 to December 31, 1916.....pounds	54,698,729
Total Export from January 1 to December 31, 1915.....	25,433,551
Total Export from January 1 to December 31, 1913.....	15,001,075
Total Export from January 1 to December 31, 1911.....	7,154,658
Total Export from January 1 to December 31, 1910.....	3,586,854
Total Export from January 1 to December 31, 1909.....	1,492,580
Total Export from January 1 to December 31, 1908.....	912,125
Total Export from January 1 to December 31, 1907.....	556,080

	1916.	1917.
United Kingdom	1,559,410	2,740,437
		559,020
	18,695	
	22,416	44,821
New South Wales.....		5,600
	3,290,537	1,584,802
		40,320
		2,240

Totals 4,891,058 5,010,840

(Imports re-exported, 1916 and 1917, 2,510,543.) To arrive at the total quantity of Ceylon rubber exported for that year deduct these imports from the total exports. The figures for 1916 and 1917 are for Ceylon rubber only.

EXPORTS OF RAW RUBBER FROM PENANG.

January, 1917.

	India Rubber.	Borneo Rubber.
North America:		
New York	764	
Boston	4,503	
San Francisco	789	
Seattle	353	

England—	
London	20,167
Birmingham	897

Totals 21,064

RUBBER EXPORTS FROM JAVA.

	December.		Twelve Months Ending December.	
	1915.	1916.	1915.	1916.
United States.....				
Ficus			45,370	
Hevea (to order)	6,720	13,040	2,885,120	342,720
Castilloa			2,240	
Totals	6,720	103,040	2,957,553	342,720
Great Britain			64,010	39,301
Hevea	322,560	636,160	4,542,730	7,244,160
Ceara	8,474	1,976	37,149	60,425
Castilloa	19,006	4,149	110,972	60,089
Totals	352,322	642,285	4,754,851	7,403,975
United States.....				
Ficus				33,031
Hevea	806,400	2,775,360	7,472,640	18,074,560
Ceara			12,852	14,542
Castilloa		6,743		24,279
Totals	806,400	2,782,103	7,485,492	18,146,412
South Africa				
Ficus		662	21,113	42,365
Hevea	257,600	347,200	1,010,240	4,482,240
Ceara	2,108	18,089	12,417	73,986
Castilloa		1,320		7,139
Totals		367,271	1,043,770	4,605,730
Other countries.....				
Hevea	13,440	15,680	264,320	69,440
Ficus				17
Other countries.....	5,863	15,349	8,065	32,380
Hevea	47,040	11,200	203,840	613,760
Totals	52,903	26,549	212,187	646,140
Grand Totals.....	1,492,340	3,936,928	16,718,490	31,214,417

IMPORTS AND EXPORTS OF RUBBER AND GUTTA AT SINGAPORE.

IMPORTS.

January, 1917.

From—	Para Rubber		Gutta	
	Rubber.	Treatment.	Rubber.	Gutta.
Malay Peninsula—				
Port Swettenham.....pounds	1,775,466	47,400		
Singapore				
M.....		4,400		
N.....		913,865		
Port Dickson		23,866		
Kelantan			133	
S. Pandjang				
M.....				
Tringganu				
Totals	4,498,959	989,531	133	
Other ports				
S.....	181,806	9,200	4,800	444,000
P.....	125,466		133	
Pentianak	4,500		3,600	64,000
Bandjermassin	27,066	5,733	89,333	118,266
S.....	10,800		5,200	97,466
S.....			17,466	145,333
Sandakan	23,600			
Singkawang				
Samarinda	26,666			
S.....			1,333	189,533
Totals	598,340	22,531	132,264	1,081,198
Exports				
Diambi	67,500	886,533		
Indragiri	28,266	13,866		
P.....	22,133			6,133
S.....		9,066		
Muntok	1,600			
Bengkalis	1,066			
Asahan		141,200		
P.....		72,800		
Totals			2,133	6,133
Other ports				
Batavia	54,266			
Sourabaya	52,266			
Samarang	24,533			
Totals	131,065			
Other ports				
Bangkok			2,000	
Potani				
Totals	1,333		2,000	
Other ports				
Rangoon	86,800			
Mergui	7,733			
Totals	290,000	355,466	9,333	13,066
Grand Totals	6,013,461	\$2,695,760	31,864	149,596

EXPORTS.

January, 1917.

To—	Para Rubber		Gutta	
	Rubber.	shipped.	Rubber.	Gutta.
United States.....				
New York	1,992,833			
San Francisco	1,507,066			
Seattle	134,400			
Portland	112,400			
San Francisco	49,733			
Totals	3,818,865	103,465		
Other ports				
London	1,366,000	1,626,266	185,600	49,333
London	244,133	376,000	22,533	59,200
Russia (Vladivostok)			36,266	
France (Marseilles)				
Italy (Genoa)				
Totals	2,441,199	2,002,266	36,266	208,133
Grand Totals	6,260,064	2,105,731	36,266	252,933

STRAITS SETTLEMENTS RUBBER EXPORTS

An official cablegram from the Colonial Secretary, Singapore, gives the export of plantation rubber from Straits Settlements ports in the month of January as 3,562 tons (of which 669 tons were transshipments), against 3,219 tons in December and 4,443 tons in the corresponding month last year.

RUBBER STATISTICS FOR THE DOMINION OF CANADA.

Ten Months Ending October, 1916.		Ten Months Ending October, 1916.		January, 1917.	
	Pounds.	Lira.		Pounds.	£ Sterling.
India rubber and gutta percha— —sheets:			Other rubber manufactures:		
Elastic fabric	2,640	5,400	To—		
Insulated wire	1,880	1,500	Albania	10,340	
Hard rubber	44,660	162,400	France	53,460	
—tubes:			Great Britain	53,900	
Cut sheets	11,220	91,800	Switzerland	52,360	
Elastic fabric	105,160	334,600	France	13,640	
Other forms	1,540	4,900	Argentina	93,720	
Belting	129,360	499,800	Brazil	49,280	
Rubber coated	2	10	Uruguay	28,760	
specified			Other countries	40,700	
Boots and shoes			Totals	401,940	1,461,600
Elastic fabrics:					
To—					
France	2,640	5,400			
Great Britain	1,880	1,500			
Switzerland	44,660	162,400			
France	11,220	91,800			
Argentina	105,160	334,600			
Brazil	1,540	4,900			
Uruguay	129,360	499,800			
Other countries	2	10			
Totals	537,020	3,661,500			
Clothing and articles for travel	3,740	39,100			
Articles not specified, from					
cut sheets:					
To—					
France	440				
Argentina	2,660				
Brazil	2,400				
Uruguay	3,300				
Other countries	2,420				
Totals	40,260	366,000			
Fabrics	76,340	312,300			

UNITED KINGDOM RUBBER
STATISTICS.

IMPORTS.

January, 1917.		January, 1917.	
	Pounds.	£ Sterling.	
From—			
Dutch East Indies	1,735,800	233,335	
French West Africa	31,400	2,037	
Gold Coast	1,400	152	
Other countries in Africa	1,128,900	121,163	
Peru	128,400	13,093	
Brazil	2,028,500	291,168	
British India	485,400	67,368	
Straits settlements and de- pendencies, including			
Labuan	3,075,800	424,600	
Federated Malay States	6,562,600	858,877	
Ceylon and dependencies	2,295,800	312,972	
Other countries	388,700	53,566	
Totals	17,862,700	2,378,331	

January, 1917.		January, 1917.	
	Pounds.	£ Sterling.	
Waste and reclaimed rub- ber	647,100	15,581	
Gutta percha	762,100	95,114	
MANUFACTURED			
Apparel, waterproofed		865	
Boots and shoes, doz. pairs	12,393	24,498	
Insulated wire		10,582	
Automobile tires and tubes		147,828	
Motorcycle tires and tubes		6,260	
Cycle tires and tubes		6,428	
Tires not specified		407	

EXPORTS.

January, 1917.		January, 1917.	
	Pounds.	£ Sterling.	
UNMANUFACTURED			
Rubber, waste and re- claimed	1,846,300	34,443	
MANUFACTURED			
Apparel waterproofed:			
To—			
France		10,124	
British South Africa		1,382	
British East Indies		1,735	
Australia		5,097	
New Zealand		5,848	
Canada		6,036	
Other countries		35,414	
Total		66,236	
Boots and shoes, doz. pairs	8,589	9,834	
Insulated wire		50,066	
Submarine cables		28,825	
Automobile tires and tubes		11,023	
Motorcycle tires and tubes		11,552	
Cycle tires and tubes		32,907	
Tires not specified		11,681	
Manufactures not specified		147,632	

EXPORTS—FOREIGN AND COLONIAL.

January, 1917.		January, 1917.	
	Pounds.	£ Sterling.	
UNMANUFACTURED			
To—			
Russia	323,800	41,203	
France	2,877,400	406,898	
United States of America	7,972,800	1,065,406	
Other countries	1,647,000	219,791	
Totals	12,821,000	1,733,298	
Waste and reclaimed	223,900	8,056	
Gutta percha	25,872	2,315	
MANUFACTURED			
Apparel, waterproofed		103	
Boots and shoes, doz. pairs	2,217	2,636	
Insulated wire		22,782	
Automobile tires and tubes		81,855	
Motorcycle tires and tubes		2,955	
Cycle tires and tubes		1,789	
Tires not specified		430	

The value of £ Sterling is \$4.76.

LONDON AND LIVERPOOL RUBBER STATISTICS.

IMPORTS.

January, 1917.

London.		Liverpool.	
Pounds.	£ Sterling.	Pounds.	£ Sterling.
UNMANUFACTURED			
From—			
German West Africa		3,700	260
French West Africa		31,400	2,037
Java	614,400		
Other Dutch Possessions in Indies	1,121,400	151,125	
Spanish West Africa		2,600	193
Italian East Africa			
United States		11,200	1,320
Peru		9,500	475
Brazil		128,400	13,093
Uruguay		2,028,500	291,168
Gold Coast	13,000		
Nigeria		1,400	152
Cape of Good Hope	97,300	14,515	
Portuguese East Africa	34,100	4,180	
Germany	3,100	324	
Switzerland	4,500	625	
Zanzibar and Pemba			
British India	485,400	67,368	
Straits Settlements	2,737,700	375,920	48,680
Federated Malay States	6,554,400	857,739	1,138
Ceylon and Dependencies	2,195,400	296,423	100,400
British North Borneo		354,000	49,013
New South Wales	10,700	1,605	
French India	10,900	1,370	
Other countries	1,900		
Totals	14,257,200	1,906,819	2,722,600

January, 1917.

London.

Liverpool.

From—		From—	
Pounds.	£ Sterling.	Pounds.	£ Sterling.
Waste and reclaimed rubber:			
France	5,500	48	
Portuguese East Africa	29,200	712	205,700
United States			7,552
Brazil			200
Argentina Republic	90,300	1,050	8
Channel Islands	1,900	25	
Cape of Good Hope	5,500	60	
Natal	10,200	204	
British India	1,500	315	600
Ceylon and Dependencies		16	33
Totals	1,419	1,419	7,593

EXPORTS.

Waste and reclaimed rubber manufactures of the United Kingdom:		Waste and reclaimed rubber manufactures of the United Kingdom:	
To—		To—	
Pounds.	£ Sterling.	Pounds.	£ Sterling.
France	23,100	1,401	29,600
Denmark			44,200
Spain	100,700	1,576	7,700
Italy	109,700	1,479	48,400
Japan			14,600
United States of America	719,400	9,775	268,800
Argentina	33,600	400	
Canada	18,000	215	
Totals	1,004,500	14,846	413,300
Crude Rubber:			
To—			
Denmark	78,300	9,643	323,800
Russia			41,203
France	1,916,100	271,869	934,200
			131,530

RE-EXPORTS.

January, 1917.

UNMANUFACTURED	London		Liverpool.	
	Pounds	St. Lbs.	Pounds	St. Lbs.
Norway	.....	.....	12,600	1,540
Switzerland	8,700	.....	.....	.....
Spain	4,500	.....	41,900	4,801
Italy	450,000	61,47	7,130	24,535
Japan	.....	.....	8,000	15,200
United States	7,019,800	976,720	394,400	35,270
Victoria	1,300	.....	5,600	7,150
New South Wales	1,500	.....	.....	.....
Canada	534,000	75,030	163,600	14,630
Totals	10,021,200	1,000,000	2,186,200	276,159
Waste and reclaimed rubber	.....	.....	.....	.....
France	77,000	2,835	4,500	146
Russia	.....	.....	11,600	427
Italy	.....	.....	78,100	2,794
United States of America	.....	.....	87,000	1,680
Totals	77,000	2,835	141,700	3,041

The value of £ Sterling is \$4.76.

THE MARKET FOR RUBBER SCRAP.

Copyright 1917

NEW YORK.

THE demand for rubber scrap has been of a routine nature for the past month, with buying confined to supplies needed for immediate requirements. The volume of business has been only fair, due to the restrictions placed on trading by the local embargoes and the congested conditions of the railroads. During the second week of the month the transportation situation at several important shipping points became easier and supplies moved quite freely. Considerable material was disposed of, but the consumers were soon satisfied and withdrew from the market. Then later in the month the threatened railroad strike prevented, for a time at least, the purchase of future requirements. That the rubber mills are well provided with abundant business is a well known fact, moreover heavy government orders have been recently booked so that the forecast is favorable for the rubber scrap market.

BOOTS AND SHOES. The consumers undoubtedly covered their requirements early in the month at prices around 9¾ delivered. Later the market softened, due to the arrivals of delayed shipments, and prices declined. Dealers were active during the last week, and sales at 9¼ cents delivered to the mills were reported. Trimmed and untrimmed arctics have declined ¼ cent since our last report.

AUTO TIRES. All grades have been dull and uninteresting, particularly the white G. & G. tires. Sales have been few and the volume of business small.

INNER TUBES. The lack of interest in this material is easily explained by the quiet position of the crude rubber market. Very little movement was noticed and prices firm but unchanged from a month ago.

MECHANICALS. While there was evidence of usual routine business from the rubber mills last month the situation has been quiet and prices unchanged.

London and Liverpool imports of waste and reclaimed rubber for January, 1917, were 538,400 pounds against 257,500 pounds for December, 1916. Exports for January were 1,417,800 pounds against 1,462,100 pounds for December.

NEW YORK QUOTATIONS FOR CARLOAD LOTS DELIVERED.

MARCH 1, 1917.

Prices subject to change without notice.

	Per Pound.
Boots and shoes	.....
Trimmed arctics	.....
Untrimmed arctics	.06 1/2 @
White tires, Goodrich and Goodyear	.07 3/4 @ .08
Auto tires, standard white	.07 1/4 @ .07
standard mixed	.06 1/4 @ .06 7/8
stripped, unguaranteed	.04 1/2 @ .05
Auto peelings, No. 1	.10 @
No. 2	.08 3/4 @ .09
Inner tubes, No. 1	.12 @ .12
No. 2	.12 @ .13
red	.12 @ .13

Irony tires	.02 @
Bicycle tires	.04 1/2 @ .05 1/2
Solid tires	.05 @ .06
White scrap, No. 1	.13 1/2 @ .14
No. 2	.10 @
Red scrap, No. 1	.10 @ .11
No. 2	.08 @
Mixed black scrap, No. 1	.04 1/4 @
No. 2	.04 @
Rubber car springs	.04 @
Horse shoe pads	.04 1/4 @
Mattings and packings	.01 @ .01 1/2
Garden hose	.01 1/2 @ .01 3/4
Air brake hose	.05 1/2 @ .05 3/4
Cotton fire hose	.12 @
Large hose	.01 1/2 @
Hard rubber scrap, No. 1, bright fracture	.26 @
Battery jars (black compound)	.02 1/2 @
Insulated wire stripping	.03 @
Rubber heels	.02 1/2 @

THE MARKET FOR COTTON AND OTHER FABRICS.

Copyright 1917.

NEW YORK.

THE American cotton market has been well supported during the past month and prices show gradual advances since our last report: February 26, middling spot cotton was 16.55 cents, and on March 18, it had reached the 18-cent mark. Later in the month the demand became more active due to various rumors of a bullish nature that on March 26, sent the price up to 19.20 cents. The grades of cotton used in the manufacture of tire fabrics costs about 1 cent a pound more than the regular sorts.

From the census report it is estimated that the available supply of American cotton for distribution during the season will approximate 14,000,000 bales, including linters. At the present rate of domestic consumption the season's requirements will be 7,000,000 bales, leaving about 7,000,000 bales for export and carry over. As a result of the unfavorable position of Sea Island and the uncertainty of the supply of Egyptian, there has been heavy buying of American peelers as a protective measure against failure of the regular supply.

EGYPTIAN COTTON. The British embargo on Egyptian cotton that went into effect early in March, applies to shipments from Egypt and England to neutral countries in British bottoms. Should the present stocks fail to carry the mills until January when the new crop arrives, there may be a serious shortage of Egyptian cotton in this market. London stocks are said to be exhausted. The situation, in case of war with Germany, would apparently be relieved by shipments being made in American bottoms. The acuteness of the market, due wholly to transportation difficulties, has resulted in higher prices for all grades of Egyptian cotton.

SEA ISLAND COTTON. The southern markets have exhibited much activity and advancing prices, due to the British embargo on Egyptian cotton. The volume of business has been large, the equivalent of 65 cents being offered for round lots. There was evidently little cotton remaining unsold by the end of the month and prices were unquotable on account of the unsettled market conditions.

TIRE FABRICS. While the general demand was more quiet than a month ago and fewer buyers were in evidence, there was much interest exhibited by the consuming trade in the present market. The doubt that now threatens supplies of Egyptian and Sea Island cotton has created an active interest in Peelers and combed peeler fabric is in demand. This is a precautionary measure on the part of the consuming trade and to just what extent American cotton fabric may be substituted for Sea Island and Egyptian remains to be seen. Seventeen, ¼-ounce, carded peeler fabric is quoted 85 to 90 cents a square yard. The other grades of standard fabrics have advanced 15 to 20 cents a pound since our last report.

DUCKS, SHEETINGS, DRILLS, ETC. The market for all these fabrics has been very active, being stimulated by government requirements that have taken precedence over all orders. The increased government business that has fallen to the rubber mills

ing. A feature of the month was the heavy buying from the Canadian mills, also for government requirements, with delivery as the principal condition of sale. Spot stocks are very scarce and the mills are sold up to the end of the year. Prices have remained unchanged and very firm.

RAINCOAT FABRICS. The reported withdrawal of certain raincoat cloths cannot be verified. The demand has been steady and all fall lines are well sold up. Government business is responsible for heavy buying of certain lines and spot stocks are consequently low. Prices are steady, with few changes worth recording.

NEW YORK QUOTATIONS.

MARCH

Prices subject to change without notice.

Woolen and Worsted Fabrics

Wamsutta, S. A. I. L. No. 1, 40-inch.....yard \$0.35 @
No. 4, 38½-inch..... .35 @

Wool Stockinettes—52-inch:

A—14-ounce.....yard 1.38 @
B—14-ounce..... 1.65 @
C—14-ounce..... 1.92 @

Cotton Stockinettes—52-inch:

D—14-ounce.....yard .55 @ .60
E—11½-ounce..... .46 @ .55
F—14-ounce..... .60 @ .65
G—8-ounce..... .52 @ .55
H—11-ounce..... .55 @ .60
I—9-ounce..... .46 @ .50

Colors—white, black, blue, brown.

Knitac Stockinette.....lb. 1.00 @ 1.05

Tire Fabrics:

17¼-ounce Sea Island, combed.....square yard 1.47 @ 1.55
17¼-ounce Egyptian, combed..... 1.25 @ 1.35
17¼-ounce Egyptian, carded..... 1.07 @ 1.12
17-ounce Pique, combed..... .85 @ .90
17¼-ounce Peelers, carded..... .70 @

Sheeting:

40-inch 2.35-yard.....yard .15¼ @
40-inch 2.50-yard..... .14¾ @
40-inch 2.70-yard..... .14 @
40-inch 2.85-yard..... .13 @
40-inch 3.15-yard..... .12¾ @

Osnaburgs:

40-inch 2.25-yard.....yard .16¼ @
40-inch 2.48-yard..... .15 @
37½-in. 2.42-yard..... .15¼ @

Mechanical Ducks:

Hose.....pound .37 @ .38
Belting..... .36 @ .37

Carriage Cloth Duck:

38-inch 2.00-yard enameling duck.....yard .20 @
38-inch 1.74-yard..... .22¼ @
72-inch 16.66-ounce..... .41½ @
72-inch 17.21-ounce..... .46 @

Drills:

38-inch 2.00-yard.....yard .19 @
40-inch 2.47-yard..... .15¾ @
52-inch 1.90-yard..... .20¼ @
52-inch 1.95-yard..... .20 @
60-inch 1.52-yard..... .26¼ @

Imported Woolen Fabrics Specially Prepared for Rubberizing—Plain and Fancies:

36-in. 34 to 40 ounces.....yard .38 @ 1.55
36-inch, 23½ to 5 ounces..... .35 @ 1.85

Imported Plaid Linings (Union and Cotton):

63-inch, 1 to 4 ounces.....yard .35 @ .75
36-inch, 2 to 4 ounces..... .25 @ .50

Domestic Worsted Fabrics:

36-inch, 4½ to 8 ounces.....yard .35 @ .65

Domestic Woven Plain Linings (Cotton):

36-inch, 1 to 2 ounces.....yard .10 @ .18

Raincoat Cloth (Cotton):

Pompadour.....yard .08 @ .09½
Twill..... .12 @ .18
Tweed..... .25 @ .35
Tweed, printed..... .07½ @ .15
Plaid..... .08½ @ .10
Repp..... .24 @ .27

Burlaps:

32—7½-ounce.....100 yards 1.75 @
40—7½-ounce..... 7.50 @
40—8-ounce..... 7.50 @
40—10-ounce..... 8.50 @
40—10½-ounce..... 8.50 @
45—7½-ounce..... 8.75 @
45—8-ounce..... 8.75 @
48—10-ounce..... 11.25 @

EGYPTIAN COTTON CROP MOVEMENT.

FROM AUGUST 1, 1916, TO MARCH 2, 1917.

To—	1916-17.	1915-16.	1914-15.
United States	163,791	124,995	
Other countries	105,391		

Total shipments to Great Britain.....	252,765	259,395	230,386
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To—	1916-17.	1915-16.	1914-15.
United States	22,665	33,945	25,114
Other countries	33,907	31,743	93,496
Great Britain	21,238	32,159	27,490
Other countries	65	50	1,604

Total shipments to all ports.....	77,875	97,897	147,704
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To—	1916-17.	1915-16.	1914-15.
United States	96,539	138,033	88,158
Other countries	8,055	16,410	8,038

Total shipments to all ports.....	435,234	511,735	474,286
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Total crop (interior gross weights) cantars.....	4,726,518	6,473,726
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(Contracted to Dacca, Benares, etc., for export.)

SEA ISLAND CROP MOVEMENT.

FROM AUGUST 1, 1916, TO MARCH 2, 1917.

Stock on hand, August 1, 1916—	Receipts.	
	1916-17.	1915-16.
Savannah, 2,401; Charleston, 107.....bales	2,508	2,382
Received at Savannah (Gross).....	42,214	34,696
Received at Charleston.....	3,376	5,532
Received at Jacksonville.....	34,748	25,192

Totals.....	82,796	67,802
Less Exports.....	77,246	56,574

Stock March 2, 1917

Savannah, 5,459; Charleston, 91.....	5,550	11,228
Crop in sight at all ports to date.....	*79,933	65,023

EXPORTS.

From	To				Totals.
	Great Britain.	Continent.	Northern Mills.	Southern Mills.	
Savannah	1,252	32,550	5,120	34,156	
Charleston	313	3,029	...	3,342	
Jacksonville	...	34,748	...	34,748	
Totals	1,565	1,060	70,327	5,120	*77,246
1915-16	1,101	1,060	50,136	4,277	56,574

Inc. 464 Dec. 940 Inc. 20,191 Inc. 843 Inc. 20,672

*In addition to the exports shown above, it is estimated that at least 20,000 bales have been shipped direct from interior points to Southern mills and to Northern mills via Norfolk, but the exact figures of this movement will not be available until the end of the season.

†Including 114 bales landed at Savannah.

(Compiled by John Malachuk & Co., Savannah, Georgia.)

THE MARKET FOR CHEMICALS AND COMPOUNDING INGREDIENTS.

Copyright, 1917.

NEW YORK.

THE metal market has not changed materially during the past month, and the tendency on the part of both buyers and sellers to await developments has dominated the situation. Copper has been quiet and unchanged. The strong position of lead has remained unchanged, but later in the month easier conditions prevailed. Spelter was dull and inactive, resulting in easier prices. Antimony was quiet and unchanged until late in the month when the market became stronger.

The demand for rubber chemicals has been active in all lines, but the difficulty in obtaining materials and forwarding supplies appears to be even greater than a month ago. In view of the abnormal situation, and with spot prices at almost prohibitive figures, the necessity of booking orders as far ahead as possible is apparent.

ANILINE OIL. The foreign and domestic demand has been active and supplies are low, due to the fact that there are now

comparatively few producers. The supply is hardly keeping up with the demand, and prices are from 32 to 35 cents.

CARBON BLACK. The demand against contracts has been active and stocks are small. Spot prices are nominal and controlled by second-hand interests. The market has advanced 12 to 15 cents since a month ago.

IRON OXIDE. The bright grades are very scarce, and prices have advanced 2 cents since our last quotations. There is an active demand for all grades.

LEAD PIGMENTS. The strong position of the raw material is reflected in the lead pigments. Red oxide, sublimed blue, sublimed white, basic carbonate, litharge and orange mineral have advanced in price during the month.

SULPHUR FLOUR. The firm position of the crude material and the aggravated condition of transportation has resulted in an advance in price. Sulphur flour is now selling for \$2.45 per hundredweight in carload lots.

VERMILION. Both English and Chinese grades are scarce and high in price, due to the demand and difficulty in obtaining the raw material. English vermilion is now quoted \$1.85 to \$2 a pound.

ZINC OXIDE. A new price schedule for French process zinc oxide in carload lots will take effect April 1, covering contract sales during the second quarter of this year. The prices are lower than those of the previous schedule. There is no change in the American brands of zinc oxide.

NEW YORK QUOTATIONS.

MARCH 26, 1917.

Subject to change without notice.

Accelerene (drums)	lb.	\$2.02 @
Acetone (drums)	lb.	.23 @
Acid, acetic, 28 per cent. (bbls.)	lb.	.03½ @ .04½
cresylic (crude)	gal.	.75 @ 1.00
glacial, 99 per cent. (carboys)	lb.	.25 @ .26
muriatic, 20 degrees	lb.	.91 @
nitric, 36 degrees	lb.	.04½ @
sulphuric, 66 degrees	lb.	.01½ @
Aldehyde ammonia	ton	1.00 @
Aluminum Flake (carloads)	ton	21.00 @ 25.00
Ammonium carbonate	lb.	.09½ @ .12½
Antimony, crimson, sulphuret of (casks)	lb.	.50 @
crimson, "Magmetco" (casks)	lb.	Nominal
crimson, "Mephisto" (casks)	lb.	.45 @
golden, sulphuret of (casks)	lb.	.27 @ .40
golden, "Magmetco" (casks)	lb.	Nominal
golden, "Mephisto" (casks)	lb.	.28 @
golden, sulphuret, States brand, 16-17 per cent. lb.	lb.	.28 @
red sulphuret, States brand	lb.	.23 @
vermilion sulphuret	lb.	.04 @
Asbestine	ton	17.00 @ 20.00
Asbestos	ton	20.00 @ 40.00
Asphaltum "G" Brilliant	lb.	.03½ @
Barium sulphate, precipitated	ton	.04½ @ .05
Barytes, pure white	ton	30.50 @ 32.00
off color	ton	15.00 @ 22.00
Basofo	ton	80.00 @
Benzol, 100 per cent.	gal.	.70 @
90 per cent.	gal.	.65 @
Beta-Naphthol (f. o. b. New York)	lb.	.90 @ .95
Brown, sienna, raw powdered	lb.	.05 @ .12
umber, raw powdered	lb.	.04½ @ .05
Bone ash	lb.	.10 @
black	lb.	.15 @
Cadmium tri-sulphate (f. o. b. London)	lb.	Nominal
sulphide, yellow	lb.	2.25 @
Cantella gum	lb.	.33 @
Carbon, bisulphide (drums)	lb.	.05 @
black (cases)	lb.	.27 @ .35
tetrachloride (drums)	lb.	.15 @ .18
Caustic soda, 76 per cent.	lb.	.04½ @
Chalk, precipitated, extra light	lb.	.04½ @ .05½
precipitated, heavy	lb.	.04 @
China clay, domestic (powdered)	ton	17.50 @ 18.00
imported (powdered)	ton	40.00 @
Chrome, green	lb.	.15 @ .20
yellow	lb.	.23 @ .25
Cotton linters	lb.	.75 @
Excellerex	lb.	.85 @ .90
Fossil flour	lb.	.03 @ .03½
Gas black	lb.	.27 @ .35
Gilsonite	ton	40.00 @
Glue, high grade	lb.	.50 @ .60
medium	lb.	.22 @ .23
low grade	lb.	.17 @ .27
Glycerine, C. P. (drums)	lb.	.54½ @ .55
Graphite, flake (400 pound bbl.)	lb.	.25 @
powdered (400 pound bbl.)	lb.	.08 @
amorphous	lb.	.07 @
Green oxide of chromium (casks)	lb.	.80 @ .85
Ground glass (fine)	lb.	.024 @ .024½
Hexamethylene Tetramine	lb.	.65 @ .75
Indian red, reduced grades	lb.	.94 @ .97½
pure	lb.	.09 @ .10
Infusorial earth, powdered	ton	65.00 @

Iron oxide, red, reduced grades	ton	65.00 @ 70.00
red, pure, bright	lb.	.02¼ @ .03½
Ivory, black	lb.	.13 @ .15
Lampblack	lb.	.18 @ .30
Lead, red oxide of	lb.	.06 @ .13
sublimed blue	lb.	.10¾ @ .11
sublimed white	lb.	.08¾ @ .09
white, basic carbonate	lb.	.08 @ .09
white, basic sulphate	lb.	.08½ @ .09¾
black hyposulphite (Black Hypo)	lb.	.48 @
Lime, flour	lb.	.01½ @ .02
Litharge	lb.	.11 @ .10½
English	lb.	.12½ @ .13
sublimed	lb.	.10 @ .10½
Lithopone, imported	lb.	.15 @ .10½
domestic	lb.	.09½ @ .09¾
Beckton white (carloads)	lb.	Nominal
Magnesia, carbonate	lb.	.11 @ .13
calcined, heavy	lb.	.65 @ .70
heavy, Thistle Brand	lb.	.12 @
light	lb.	.75 @ .80
Magnesite, calcined, powdered	ton	35.00 @ 39.00
Mica, powdered	lb.	.03¾ @ .05
Mineral rubber	lb.	.01 @ .02
"M. R. X."	ton	100.00 @
"Genasco" (carloads)	ton	37.00 @
"Richmond Brand"	lb.	.03 @
"No. 64 Brand"	ton	40.00 @
"Refined Elaterite"	lb.	.05 @
"Rubrax"	ton	32.50 @
Naphtha, stove gasolene (steel bbls.)	gal.	.24 @
66@68 degrees (steel bbls.)	gal.	.29 @
68@70 degrees (steel bbls.)	gal.	.30 @
V. M. & P. (steel bbls.)	gal.	.21 @
Oil, aniline	lb.	.32 @ .35
corn, refined (Argo)	cwt.	14.01 @
linseed (bbl.)	gal.	.93 @
paraffin	lb.	.14½ @
paraffin (cases)	gal.	.17 @
pine (cases)	gal.	.58 @
rapeseed, blown	gal.	1.15 @ 1.17
rosin, heavy body	gal.	6.75 @
tar (cases)	gal.	.22 @
of the white colors, yellow, orange	lb.	.50 @
Orange mineral, domestic	lb.	.12½ @ .13½
Paragol (carloads)	cwt.	10.89 @
Petrolatum	lb.	.06¼ @
Petroleum grease	lb.	.04 @
Pine solvent	lb.	None
Pine tar	bbl.	9.25 @
Pitch, burgundy	lb.	.03¾ @ .04
coal tar	bbl.	4.50 @
penetrant	lb.	.01½ @
Plaster of paris	lb.	1.50 @ 1.70
Prussian blue	lb.	.65 @ .90
Pumice stone, powdered (bbls)	lb.	.03 @ .04
Resin, Pontianak, refined	lb.	None
granulated	lb.	None
fused	lb.	None
Rosin (500 pound bbls.) @ 280 lbs.	bbl.	5.95 @ 8.50
Rotten stone, powdered	lb.	.02½ @ .04
Rubber black	lb.	.06 @
Rubber substitute, black	lb.	.09 @ .12½
white	lb.	.13½ @ .18
brown	lb.	.13 @ .18
Rubhide	lb.	.35 @
Shellac, fine orange	lb.	.58 @
Silex (silica)	ton	30.00 @ 50.00
Soapstone, powdered	ton	14.00 @ 20.00
Starch, extra, powdered	cwt.	3.69 @
Sulphur chloride (drums)	lb.	.08 @
Sulphur, flour, velvet, brand (carloads)	cwt.	2.45 @
Bergenport, pure soft brand	cwt.	2.20 @
Talc, American	ton	14.00 @ 18.00
French	ton	24.00 @ 28.00
Tolnol, pure	gal.	1.75 @ 2.00
Tripolite earth, powdered	ton	65.00 @
bolted	ton	65.00 @ 70.00
Turpentine, pure gum spirits	gal.	.46½ @
wood	gal.	.41½ @
Venice	gal.	.11 @ .12
Ultramarine blue	lb.	.18 @ .45
Vermilion, brilliant	lb.	Nominal
Chinese	lb.	.95 @ 1.00
English	lb.	1.85 @ 2.00
Wax, beeswax, white	lb.	.55 @ .60
ceresin, white	lb.	.18 @ .22
carnauba	lb.	.35 @ .55
ozokerite, black	lb.	.55 @ .60
green	lb.	.70 @ .75
montan	lb.	.32 @ .33
paraffin, refined 118/120 m. p. (cases)	lb.	.08 @
123/125 m. p. (cases)	lb.	.08½ @
128/130 m. p. (cases)	lb.	.09½ @
133/136 m. p. (cases)	lb.	.11 @
crude, white, 117/119 m. p. (bbls.)	lb.	.06½ @ .06¾
yellow, 124/126 m. p. (bbls.)	lb.	.07½ @
Whiting, Alba	cwt.	1.00 @ 1.25
commercial	cwt.	1.00 @
gilders	cwt.	1.10 @
Paris, white, American	cwt.	1.25 @
English cliffstone	cwt.	1.50 @
Wood pulp XXX (carloads)	ton	Nominal
Yellow ochre (Satin)	lb.	.03 @
india rubber	lb.	1.50 @
Zinc oxide, American process, horsehead brand	lb.	.10 @
"XX red"	lb.	.10 @
"special"	lb.	.10 @
French process, red seal... f. o. b. factory lb.	lb.	.17½ @
green seal... f. o. b. factory lb.	lb.	.18½ @
white seal... f. o. b. factory lb.	lb.	.18½ @
Zinc substitutes	ton	34.00 @
Zinc sulphide, pure	lb.	Nominal



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Edited by HENRY C. PEARSON—Offices, No. 25 West 45th Street, NEW YORK.

Vol. LVI. No. 2.

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Published on the 1st of each month by

THE INDIA RUBBER PUBLISHING CO.

No. 25 West 45th Street, New York.

Telephone—Bryant 2576.

CABLE ADDRESS: IRWORLD, NEW YORK.

HENRY C. PEARSON, Editor

Vol. 56

MAY 1, 1917

No. 2

SUBSCRIPTIONS: \$3.00 per year, \$1.75 for six months, postpaid, for the United States and dependencies and Mexico. To the Dominion of Canada and all other countries, \$3.50 (or equivalent funds) per year, postpaid.

ADVERTISING: Rates will be made known on application.

REMITTANCES: Should always be made by bank draft or Postoffice or Express money order on New York, payable to THE INDIA RUBBER PUBLISHING COMPANY. Remittances for foreign subscriptions should be sent by International Postal Order, payable as above.

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Entered at the New York postoffice as mail matter of the second class.

TABLE OF CONTENTS ON LAST PAGE OF READING.**RUBBER IN NATIONAL DEFENSE.**

THE United States has at last been constrained irrevocably to take her place in the battle line of democracy. Freedom of the seas, a principle of vital import to the rubber industry, is the immediate cause that rendered the policy of armed neutrality inadequate; but the great decision has a far broader significance. America realizes at last that the fight is one in which she must not fail to participate.

In his epochal war message President Wilson made it plain that this nation has no quarrel with the German people; that it has no territorial, monetary or other selfish ambitions, but as a great champion of human liberty, individual rights and the brotherhood of man, has drawn the sword—to paraphrase the words of the immortal Lincoln—"that the world shall, under God, have a new birth of freedom, and that government of the people, by the people, for the people shall not perish from the earth."

Since we must fight in defense of a cause worthy of our best traditions, indeed the greatest that ever

engaged human endeavor, let the war be prosecuted with all vigor and thoroughness, that there may the sooner be a conclusive peace. Our first contribution to the cause of world freedom will be economic. America's great wealth and vast mineral, agricultural and manufacturing resources can be drawn upon immediately, while her navy has already assumed its share in keeping open the world's shipping lanes. Meanwhile, great armies must be trained and equipped, and through the more elastic medium of wooden ships the steel tonnage that has been destroyed must be hastily replaced.

Most of the larger industrial plants, rubber mills among the first, have been placed at the command of the government; organized labor has pledged its hearty support, and operatives of all sorts have taken up military training. Such industrial preparedness is of prime importance and, profiting by the early experience of our allies, America must not sacrifice her chemists, engineers, skilled mechanics or other trained executives and workmen in the industries vital to national defense. No one can read the summary of the manifold and indispensable uses of rubber in warfare on another page and fail to realize that many rubber experts must be numbered among those exempted from enlistment. Fortunately this is recognized by the Council of National Defense, and the policy of selective conscription on the principle of universal liability to service, advocated by the War Department, is an expression of it.

Let skilled rubber men organize for home guard duty, but not in their loyalty respond too hastily to the call for volunteers and forsake the equally important mission of military equipment to which their experience better fits them. The government will call individually for those whose plain duty lies at the front, while all who remain to supply the enormous demand for many varied rubber manufactures, without which untold troops would be of no avail, will have served their country well and taken an honorable and necessary part in the world's fight for liberty and enduring peace.

MAKING AMERICAN CITIZENS IN RUBBER FACTORIES.

THE Rubber Association of America is cooperating with the Immigration Committee of the Chamber of Commerce of the U. S. A. to encourage Americanization of our foreign-born population. The movement is patriotic as well as commercial and deserves the hearty support of the rubber and allied industries. A certain result of the war will be an enormous shifting of workmen who must be replaced. Therefore, to raise the efficiency of each and every one to the utmost becomes at once a safeguard in national defense and industrially a precautionary benefit alike to employer and employee.

Happily, rubber manufacturers have long been among the leaders in welfare work, which has in recent years expanded tremendously, offering congenial occupation for the spare moments of those who had few advantages in youth. Partly an expression of the desire for maximum efficiency through advancement of men from the ranks to responsible positions, it is also in large measure an embodiment of the American spirit which welcomes the alien to our shores and encourages him to enjoy American institutions with us. The feeling grows that we owe more than a day's wage to those men and women who have chosen America as the place in which to work out their destiny and who have crossed the ocean to make it their home.

This social obligation is recognized and being met in the principal factories and many others of lesser importance. Club rooms and even club houses are being provided with restaurants, rest, reading and music rooms; auditoriums for lectures, entertainments and motion pictures; libraries of rubber and educational books and magazines; game rooms, swimming pools and sanitary conveniences; hospitals and free dental service. Outdoors there is often a field and grandstand for baseball, football and other athletic games. These benefits conserve health, promote a high moral standard, and, together with periodicals published in the interests of the employes, broaden acquaintance, keep all in touch with the news of the plant, and encourage firm spirit and team work.

Every man is urged to improve his education, and aliens are encouraged to become American citizens. Free evening instruction is provided in several instances, and foremen have instructions to tell aliens of the free evening classes of the public schools and, wherever available, of the correspondence courses of the state university extension service. Both the Y. M. C. A. and the Y. W. C. A. are active in social, religious and educational benefits, and the Boy Scout movement is claiming many of the more youthful operatives. Every man is made to understand that education means advancement and that long service is rewarded by annuity. The increase in capital stock of several companies and the reduction in par value to \$10 a share is enabling some of the workmen to invest their savings profitably, while others are embracing opportunities afforded them by their employers to buy home sites and houses on easy, advantageous terms.

The manner in which our foreign cousins are responding to these influences for betterment is very gratifying. It is to be expected, however, that enthusiasm will sometimes lag in the schoolroom after eight hours' labor in the factory. This is particularly true in English language classes, for the alien finds ours a difficult tongue to learn. Various means of stimulating renewed interest have been tried, but probably the most unique and successful is that of devoting several minutes of the class time every day to

singing American patriotic songs to piano accompaniment. To see 200 aliens representing 18 nationalities joining heartily in singing "America" is indeed an inspiring sight that augurs well for the future.

AN ASSOCIATION FOR BETTER LEGISLATION.

IN the Associated Industries of Massachusetts the Bay State has an efficient and much-needed organization. Its membership comprises most leading manufacturers of the state, including several rubber, textile, machinery and footwear firms familiar to readers of this paper, who are cooperating in bringing the influence of intimate knowledge and expert experience to bear upon all proposed industrial legislation.

The active work of the association is divided between the Central Legislative and Technical Advisory Committees. The former reads the bills, decides upon the desirable action, and refers its recommendations to the Executive Committee for approval. It maps out the line of action at hearings, and assists and directs the work until the measure is finally disposed of.

The Technical Advisory Committee organizes technical boards representing every industry and composed of men well informed about manufacturing operations, whose duty it is to supply state boards, commissions and legislative committees with facts and expert information as to the probable workings of proposed rules or codes regulating factories, to assist in drafting new and perfecting existing codes, and report on their actual workings.

That the scope may be made broader and more liberal, a Council of Associations is being organized which will eventually be composed of one representative each, from the various business organizations, such as the National Metal Trades Association, the Boot and Shoe Association, etc. By such council and concerted action it will be possible to express very nearly the thought and sentiment of the entire business community of the commonwealth for constructive and defensive purposes.

GUMSHOE MARMALADE IN GERMANY.

THE daily press of late has been favoring us with several more or less accurate pictures of the food situation in beleaguered Germany. Some of the statements appeal to reason; others do not. Certain it is that substitutes of many sorts are in daily use. Nevertheless, we can hardly credit the recent assertion that worn-out gumshoes treated with nitric acid, to which are added wood pulp, artificial seeds and a little chemical flavoring, now pass there as marmalade. We agree with the writer that this vague recipe suggests neither a savory nor a toothsome delicacy, but in Germany military needs ever take first place and rubber is far too scarce to feed to the populace. Rubber scrap and fatty waste are as precious as diamonds and gold nuggets in Germany today, and it is a safe bet that every available ounce of the former is reclaimed and utilized in the manufacture of army and navy equipment.

The Indispensability of Rubber in Warfare.

THE call to arms has come. Army and navy are preparing for action. Men are of little avail without munitions and equipment, among which rubber in one form or another has become indispensable. Never until the present international conflict has this substance played such an important part. Its manifold applications in modern warfare were described in detail by many papers in volumes 51 and 52 of THE INDIA RUBBER WORLD, but the vital importance of the rubber industry in equipping the army, navy, air service and Red Cross, second only to arming and feeding the nation's fighting forces, warrants a summary of its many ramifications at this critical time in American affairs.

TRANSPORT.

First, we may consider the requirements of an army, prepared for conflict upon land. To-day is the day of the automobile, the motor-cycle and the motor truck; the first two for quick travel of individuals or small parties from point to point, and the last to replace mules to draw munition and commissary wagons and artillery. All these require tires of rubber, a fact in itself by which is proven the almost absolute indispensability of rubber in the progress of armies. In this one use, the manufacture of tires, rubber is to-day almost as important as food and ammunition, for on rubber tires every other necessity is borne to the front.

ARMY EQUIPMENT.

Rubberized fabrics are in urgent demand. Waterproof covers for wagons, guns and gun carriages are needed in great quantities, while ground sheets, tent coverings, ponchos, and even accoutrements are made of coated fabrics. The manufacturer of sheeted cloth will find there are many uses in the army for his product, while new demands must constantly present themselves for this class of materials. The soldier must be provided with haversack, and fastenings for the same, and here rubber and fabric are taking the place of leather. This latter material, advancing in cost as it is diminishing in supply, is fast being replaced by rubber for the soling of boots and shoes, and the claim is made that the new fiber and rubber soles have advantages not only of longer wear, but of more flexibility, and a waterproof quality not possessed by leather. Trench warfare has made rubber boots necessary to prevent the serious illness that soldiers contract in these muddy ditches.

THE AIR FLEET.

To-day fighting is done not only on the land, but in the air, on the water, and even beneath it, and aircraft, warships and submarines all require rubber in so many and varied forms that it would be but slight exaggeration to say that none of these could exist without the precious gum.

No substance has been found which can replace rubber in the manufacture of balloon fabrics. While the double fabric which forms the bags for dirigibles and "blimps" has not yet been made absolutely impervious to the passage of gases, no other material which has otherwise been considered practicable, has approached it in this particular. The wheels are rubber tired. The aviators wear rubber clothing, that they may conserve their bodily heat when in the colder and more rarefied atmosphere of high altitudes, and many of these suits are capable of acting as life preservers, if the aviator falls in the water.

Much rubber is also employed in the making of respirating apparatus, enabling the airman to breathe while at these great heights. That new invention, the stabilizer, requires rubber for insulation, packing and tubing, while every airplane uses tubing or solid rubber for cushioning the operator's body from shock, and for protecting exposed parts liable to damage in alighting.

THE NAVY.

The battleship has so many rubber requirements that only a general mention can be made. It is a habitation for many hundred men, and as such needs all the appointments of a modern hotel or dwelling, with its plumbing, its electric wiring, etc.; all the accessories of a machine shop, with its gaskets, its washers, its tubing; all the requisites of a fortress, its shock absorbers, its rubber carpeting; all the fittings of a hospital, of which more hereafter, and besides these all the essentials of a metal body floating in water, which must be watertight in all its joints, while its bulkheads must be packed as strongly as steam boilers to withstand pressure in emergencies, and, of course, large amounts of hose are necessary.

THE UNDERSEA FLEET.

Many, indeed, are the rubber requirements of ships that sail the seas, and even more numerous those of the fleet which sails below the ocean's surface. There, surrounded on all sides by water, with pressure increasing with every foot of submersion, the most exacting necessity is the packing of all joints, the use of gaskets on all hatches, around the inlets and outlets of the torpedo tubes, and the joints of the torpedoes themselves. There are many buffers for the doors, and packings to make them waterproof. There must be packing around the periscope tubes, and around the lenses in them, and cushions to protect the observer's face from jars and bruises when using these necessary tubes. These submarines are usually propelled by electricity when submerged; and much rubber is used for insulation, to prevent leakage and short circuiting. Hundreds of hard-rubber battery jars must each have its tightly fitted rubber-sealed cover, and its enclosed rubber separators, while much sponge rubber is used in the elimination of gas and acid fumes from these batteries. The crews of some submarines are provided with life-saving suits of rubber to be used in the event of disability of the vessel to rise to the surface.

THE RED CROSS.

War consists primarily in the destruction of life, but a merciful adjunct to all branches of service is the hospital, be it in the field or on shipboard. The readers of this page are acquainted with the many surgical sundries and appliances used in every hospital, which are made wholly or partly of hard or soft rubber. There is no need of their enumeration here. With our forces in action all such supplies will be needed in great quantities.

MUNITIONS MANUFACTURE.

Rubber also plays an important part in the manufacture of modern high explosives. The chemicals used in their production require careful handling, the health, and often the lives of the operatives depend upon the rubber gloves, aprons and boots they wear. And if the materials are full of danger, how much more so the explosives, when manufactured, and here the requirements regarding metal-less footwear are compulsory.

ARTIFICIAL RESPIRATION.

In all these branches of service there are vicissitudes when resuscitation may be necessary. The airman may lose his breath because of rarefied atmosphere or swift descent; the soldier may be subjected to gas attacks, the sailor to drowning, the submarine sailor to noxious fumes, and all of them to sudden severe nervous shock, which may be fatal unless artificial respiration is quickly available. The many kinds of apparatus for such purposes are all more or less dependent on rubber for tubing, gas bags and inhalers. And here might also be mentioned the gas helmets and oxygen breathing apparatus furnished soldiers likely to be assaulted by gas attacks of the enemy.

This is far from being a complete list of the various forms in which rubber is required in modern warfare. Few, if any, industries are more important than our own in the present emergency. That the rubber manufacturers of this country are prepared to fill all these requirements is a source of satisfaction in this critical period of the nation's history.

THE PRESIDENT'S CALL TO INDUSTRY.

IN that significant proclamation to his fellow-countrymen issued April 15, President Wilson emphasized the vital importance of industrial America in bringing the war to a successful conclusion. In the performance of this great task calling for large service, great efficiency and much self-sacrifice, the industrial forces of the country will become, he asserts, "a notable and honored host engaged in the service of the nation and the world, the efficient friends and saviors of free men everywhere."

It is in this spirit that the Council of National Defense has sought the active cooperation of producers of raw materials and manufacturers in meeting wartime needs promptly, adequately and well. Agreements have already been made with steel and copper producers, under which the Government is guaranteed all of these materials required for war purposes at prices far below the prevailing market. Negotiations are now in progress with oil and other producers, while an agreement with the rubber industry is foreshadowed in the appointment of a committee of rubber men to act in conjunction with the Committee on Raw Materials of the Council of National Defense. The new body, all good men and practical, consists of A. H. Marks, vice-president of The B. F. Goodrich Co., Akron, Ohio; Frederic C. Hood, vice-president and general manager Hood Rubber Co., Watertown, Massachusetts; H. Stuart Hotchkiss, vice-president General Rubber Co., New York City. Its announced purpose is to secure a speedy and adequate supply of rubber at prices which will permit no excess profits on government orders during this period of national emergency.

Agreements, such as those already negotiated, to furnish military equipment at prices which investigation shows to be reasonable, will not only insure maximum results from the nation's great war appropriations, and make purchases possible without competition, but will render it unnecessary to take over any plants for government operation. The large output of rubber manufactures already at Government disposal, indicates that the rubber industry as a whole places the national defense above profit or material advantage and will welcome any reasonable scheme for government cooperation.

PREPAREDNESS ACTIVITIES IN THE TRADE.

THE Pennsylvania Rubber Co., Jeannette, Pennsylvania, in response to the appeal of President Wilson for an increased production of foodstuffs, has turned over to its employes the extensive acreage surrounding its large plant. The company will do the ploughing and cultivating and each employe will look after the crop on his section during the season, and receive the profit when it is marketed.

Van Cleef Bros., Chicago, manufacturers of rubber cement, are utilizing a vacant space about their plant to interest their employes in raising foodstuffs. The company will lend every support possible and encourage their help, the employes to have all the crops.

Reports of the commandeering of manufacturing plants by the Government have appeared in local papers owing to activities of the five engineering associations in connection with the Naval Consulting Board, the object being to list the industrial resources of the country and insure the services of skilled men in manufacturing material for the use of the Government. Among the establishments erroneously reported to be commandeered was the

Cutler-Hammer Manufacturing Co., Milwaukee, Wisconsin, of which General Manager A. W. Berresford is a member of the Naval Consulting Board. He states that of the 2,000 employes, 400 shop men and 40 in the testing room engineering and office forces are enlisted in the Reserve, and may be called upon to do Government work in this factory, but this will not interfere with the regular business, and normal shop conditions.

Reports of like nature regarding several Akron, Ohio, concerns were found on investigation to be of a similar nature, the stories of commandeering the plants resulting from the taking of inventory and stock by Federal agents. The B. F. Goodrich Co. employes to the number of 1,000 have joined this Reserve, thus pledging themselves to work on Government contracts when needed. The Goodyear Tire & Rubber Co. reports that it has arranged for classes in military training, giving all employes an opportunity to learn under the auspices of ex-army officers.

C. P. Mader, secretary, Bucyrus Rubber Co., Bucyrus, Ohio, is captain in the Quartermaster Officers Reserve Corps, and for several years has been chairman of the military committee of the Bucyrus Chamber of Commerce. A number of the employes have signified their intention of entering some branch of military service.

George E. Hall, vice-president and general manager, and J. W. Fellows, factory manager, of the Boston Woven Hose & Rubber Co., Cambridge, Massachusetts, are prominently connected with the Public Safety Committee, and James H. O'Brien, superintendent, has joined the Home Guards. Over 160 employes of the company intend to enlist and 30 have already done so. A uniformed Home Guard is being organized, which will be a unit of the Cambridge Defense League.

Superintendent E. W. Dunbar, of the Apsley Rubber Co., Hudson, Massachusetts, is chairman of the Public Safety Committee of that town. President L. D. Apsley states that if the Government requires any Apsley goods these needs will have first attention, the regular customer and the profit having only secondary consideration.

The women in the making room of the Tyer Rubber Co., Andover, Massachusetts, started contributing weekly to the Red Cross and every department adopted the idea, and the result is that a large sum is sent weekly to the society. It has the financial support and cooperation of the officials of the rubber company.

The Cupples Co., St. Louis, Missouri, report that several employes have already enlisted, and that 150 young men are being instructed in military drill, the time being taken from the company's working hours.

COTTON GOODS MANUFACTURERS COOPERATING.

The committee on cotton goods industries appointed by the Advisory Commission of the Council of National Defense comprises Lincoln Grant, of Wellington, Sears & Co., chairman; W. D. Judson, of Parker, Wilder & Co., secretary; Fred. S. Bennett, of the William L. Barrell Co.; Spencer Turner and John E. Rousmaniere, of the J. Spencer Turner Co.; Fuller E. Callaway, cotton manufacturer, Lagrange, Georgia; Harry L. Baily, with Wellington, Sears & Co., and A. F. Bemis, of the Bemis Bros. Bag Co., and president of the National Association of Cotton Manufacturers. This committee has sent a letter to the cotton mills of the country asking for information about the kind of goods turned out, number of looms, etc. It is said that the replies received have not been altogether satisfactory to the committee. Chairman Grant reports that many of the mills had expressed their willingness to cooperate, but that the majority of these were not equipped to turn out the kinds of goods most needed. It is understood that about 25 mills which can make these goods have yet to express their willingness to devote their looms to making goods required by the Government.

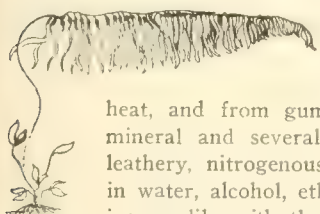
Kelp Might Provide a Rubber Plastic.

OFF the coast of southern California, a business new to the United States, and by no means devoid of interest to the rubber industry, has sprung up, and since last July achieved national importance. It is the extraction of potassium chloride for munition manufacture and the separation of various other by-products from certain large Algae or seaweeds, particularly *Macrocystis pyrifera*, known as kelp.

Those who have followed the interesting developments in the rubber trade for the past decade will perhaps recall that six or eight years ago companies were formed both in England and America for the manufacture of rubber from kelp. Nothing came of either venture. "The India Rubber Journal" manifested no faith in the British invention, and as stated in THE INDIA RUBBER WORLD, the stock-selling circular issued by the promoters of the American company indicated so conclusively their ignorance of rubber technology that the matter was never taken seriously by the trade. The sample sent for inspection looked very much like the compounded sheet and from a physical examination seemed to be the kelp product mixed with rubber dough.

Kelp, however, abounds in a thick, gluey liquid, known as algin, which possesses many useful properties. It slightly re-

ssembles gelatin, but differs from it in not coagulating to a jelly nor being precipitated by tannin; from albumin in not coagulating by



heat, and from gum arabic in being precipitated by mineral and several organic acids. Algin gum is a leathery, nitrogenous substance, alginic acid, insoluble in water, alcohol, ether and glycerin, although combining readily with the lighter alkaline metallic bases to form substances many of which are soluble. Does this not suggest the possibility that in kelp there may be a plastic which the rubber trade can use? Solutions of algin have 14 times the viscosity of starch and 37 times that of gum arabic, rendering it excellent as a glue. As it combines easily with rubber, shellac and other gums, it can be made an important ingredient of waterproofing compounds for cloth. It can also be utilized as a thickener and for fixing iron and aluminum mordants in calico printing, and for emulsifying oils and clarifying wines and spirits.

With the heavier alkaline metallic bases, algin forms insoluble compounds as pliable as gutta percha or as tough as horn, in which latter state it may be turned and polished like ivory or the ivory nut. In thin, transparent sheets it offers a substitute for parchment paper, gutta percha, gelatin, celluloid, isinglass or artificial leather. Like celluloid, too, it may be used for the manufacture of buttons, combs, knife handles, etc. Indeed, of the four small kelp concerns at San Pedro, one at present makes such articles, while another turns out pails and similar utensils from the pulp, which is also excellent for the manufacture of paper.

In coast regions the world over, wherever kelp occurs, it has long been employed as a fertilizer, and until the close of the eighteenth century, formed the chief source of the supply of potash in western Europe. Kelp salt, the residual ashes of the seaweed after separation of the potash, contains sodium sulphate, carbonate and chloride, together with small quantities of potassium sulphate, and was formerly much used in the manufacture of glass and soap, but of recent years has been valuable almost solely as a source of iodine, which is an important constituent. Some bromine is also obtainable. Thus this industry is but a reversion with improved methods to a business of bygone days.

When the European war cut the United States off from the world's supply of potash, the mines near Stassfurt, Prussia, where carnallite and *cænite* are found in abundance, American

scientists at once began to develop other sources. These minerals contain potassium and magnesium sulphate as well as magnesium chloride, and among the products obtained from them are saltpeter (potassium nitrate), the principal ingredient in the manufacture of gunpowder, and potassium chlorate, used in the arts as an oxidizing agent and essential to the manufacture of several high explosives. Both have been in such tremendous demand as to warrant the expenditure of millions of dollars in the development of the kelp industry and extensive experimental work for utilization of the by-products of potash manufacture.

Potash, or potassium carbonate, the so-called vegetable alkali, plays an important part in vegetable life, existing in all plants in varying proportions, and in various combinations with both inorganic and organic acids. When plants are burned, the inorganic constituents remain behind in the ashes, and it was by bleaching these ashes that potash was first obtained, the name being derived from the fact that the solutions from wood or other vegetable ashes were boiled down or concentrated in great iron pots.

Were potash the only consideration, this infant American in-



KELP HARVESTER SHOWING ENDLESS DRAG CONVEYORS.

dustry would be but temporary, for in peace times it can be procured from the German mines more cheaply than in any other way; but so many useful by-products are made available through its manufacture from kelp by chemical extraction rather than burning that there is good prospect that the business will continue to be profitable after the war. Another vital factor in the choice of kelp rather than other potash-yielding plants is especially favorable. No vast acreage of valuable land must be devoted to its culture; there is no expense of planting, cultivation or combating insect pests. It grows wild in the sea along rocky shores and requires only to be cut and carried ashore for refining. The harvesting and manufacturing are the only costs, and the supply is seemingly inexhaustible. Being one of those flowerless plants never having true stamens and pistils, it propagates rapidly by spores or simple cell division.

Kelp is found all along our Pacific Coast from Cedros Island, Lower California, to Alaska. The report of the Department of

Agriculture survey of these kelp beds in 1914 showed that there are available about 59,300,000 tons of kelp, if it were harvested semi-annually, or equivalent to 2,266,000 tons of potassium chloride. Our total imports of potash salts are about 1,000,000 tons, equivalent to 400,000 tons of potassium chloride.

The kelp groves are densest off Point Loma, San Nicholas Island, and San Clemente Island, due west from San Diego. The government report gives 16,000,000 tons of kelp on an area of 91 square miles from Cedros Island to San Diego, and 18,000,000 tons on an area of 97 square miles from San Diego to Point Concepcion. Thus the kelp industry has sprung up about San Diego, and the \$175,000 government kelp plant and laboratory, under the direction of Dr. J. W. Turrentine, will be built there or at San Pedro.

There are three principal firms at San Diego working in as many different ways. The Swift Packing Co. has a \$250,000 wharf and plant employing about 75 men, which is merely a temporary project for the duration of the war. The kelp is dried in nine large revolving drums by direct heat, then ground like feed, sacked and shipped for fertilizer. As 90 per cent of the kelp is water, the fertilizer yield by drying is 10 per cent.

The San Diego Kelp Ash Co. buys and sells the ash of burned kelp for fertilizer. The kelp is gathered and prepared by small independent companies or individuals, who sell the ash to the distributing company as a farmer sells his grain. The crude improvised implements with which the harvest of the sea is gathered, dried and burned, render this the most picturesque aspect of the industry, though of scant significance. Altogether about 100 of these independent workers prepare about 200 tons of ash a month, about 1½ tons of ash being produced from 20 tons of kelp.

Not these two concerns, but the activities of the Hercules Powder Co. have brought the kelp industry to the attention of the nation. This firm has expended \$2,000,000 on a great plant to extract potash from kelp for the manufacture of munitions by means of chemical solutions. It covers 30 acres, includes a 2,300-foot wharf, and employs over 1,100 men in three shifts, 50 of them being expert chemists, engineers and superintendents. The payroll is said to be \$70,000 to \$80,000 a month. There are several buildings, such as a large still house, centrifugal drier house, huge filter press house, 2,700-horsepower steam plant, and numerous great storage tanks aggregating 12,000,000 gallons, including 156 wooden tanks of 50,000 gallons capacity each, used as digesters of the pulp.

For cutting the kelp and transporting it to the plant, three curious kelp harvesters, three tugs and nine barges are employed. Because of their unique character a peculiar interest attaches to these great sea-going mowing machines for cutting at a depth of six feet under water this giant seaweed, which often grows to a length of 100 to 200 feet, or considerably more. Resembling the familiar dredge, they are twin-screw barges with great cycle knives that work on a bar like a mower in front of the vessel. As the barge moves forward the kelp is gathered up on a screen and conveyed by an endless drag to the pits of the boat, where it is ground finely and transferred to the barges to be taken to the plant. A crew of 12 men operates and lives on each harvester.

The \$20,000 harvester of the Swift Packing Co., 38 by 150 feet, differs in that the kelp, after being cut into pieces about six inches in length, is dropped into six large bins in the hold until taken to shore by the harvester itself. The mower consists of knives attached to an endless chain, and cuts a swath of 40 feet. This harvester has a capacity of 500 tons a day, although on account of unfavorable weather conditions and rough seas, which reduce the working day to four or five hours, does not average over 200 tons.

Numerous secret processes effect the change of kelp into potash, although most of the details are well known. First the macerated seaweed is allowed to ferment in great wooden tanks

for 10 days. The coarse leaves are then screened off, and the liquor is pumped into vats, where a chemical solution is added. It is then boiled to kill the bacteria and run into large sediment vats to settle. From there the liquid goes through filter presses and the mud is left on the cloth of the press, while the liquor filters through. By means of multiple effect evaporators the water is removed from the liquor without precipitating the salts. Then by means of evaporation again, in large vertical tanks with conical bottoms, the salts are precipitated from the liquor into the chambers below and scraped out with a hoe. The potassium chloride, which is the starting point for the manufacture of other potash salts, is separated from the sodium chloride, or common salt, by crystallizing first at one temperature and then at another. As the potassium chloride is more soluble in hot than in cold water, whereas the sodium chloride is about equally soluble, the potassium salt accumulates in the cool vat and the sodium salt in the hot one. After several refining processes the chemically pure potassium chloride is scraped out from the chambers below the evaporating tanks, when the usual processes of converting this into other potash salts may be begun.

Besides potash and saltpeter for the manufacture of matches



PUMPING GROUND KELP FROM THE HARVESTER INTO A BARGE.

and various explosives, acetone, for the making of smokeless powder, and also iodine, are taken from the mother liquors, while the trailings or mud from the filter presses, which retains a small percentage of potash, is sold for fertilizer. No part of the three barge loads of kelp that pass through the plant daily go to waste, for science and inventive genius have found ways to utilize everything in the composition of kelp, and the experiments now in progress by the government, the Hercules and other companies, promise to develop still further uses, some of which may be closely allied with the rubber industry.

When the war is over and munition manufacture languishes, potash salts will not be in such great demand, and a greater percentage of the output of the kelp industry will be available for other uses. Why not a rubber plastic? Meantime nearly all of the immediate and later products of this new American industry are employed by rubber manufacturers as coagulants, solvents, compounding or vulcanizing ingredients with rubber, gutta percha or their substitutes; also in waterproofing and insulating mixtures, rubber reclaiming and the manufacture of artificial leathers. Therefore, a new source tending to insure an ample supply at moderate prices is of interest in itself, aside from future possibilities.

Making Seamless and Transparent Rubber Goods.

THE manufacture of seamless and transparent rubber goods in the United States has not experienced the unusual growth that has characterized other branches of the rubber industry. In the past this has been almost wholly due to the competition of German manufacturers, who were able to undersell the American producer, and thereby control the market. Now that this depressing competition has been removed, the

have a tendency to produce blisters. The solution is made in the ordinary vertical type of power-driven churn, although recently the Universal solution churn has come into more general use.

In the preparation of crude rubber for the manufacture of transparent goods the procedure is radically different from that of ordinary seamless goods. Para, Ceylon and Ceara mixed with African rubber of good quality may be used. Pale Ceylons are very satisfactory and the Brazilian sorts, when used alone, produce slightly opaque goods, but quite nervy, while with African rubber they are both softer and clearer. Inferior rubbers are not used in the making of transparent rubber goods. As heat makes the rubber opaque, the washing process is precluded and the rubber is cut in small pieces and dissolved in benzene in a solution mixer. The heavy impurities may be strained out, but the fine particles are removed by a settling process; the time required to produce a perfectly pure solution depending on the quality of the gum and the required thickness of the solution. The dipping forms may be of wood, porcelain or

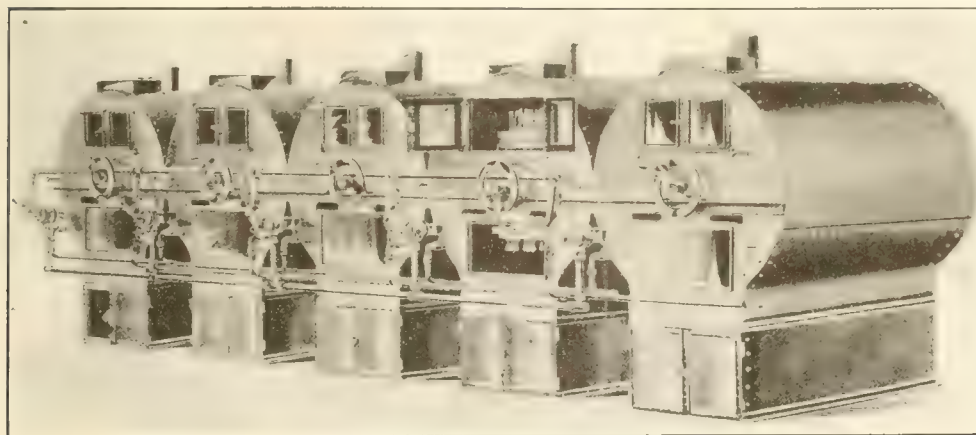


FIG. 1. MACHINES FOR MAKING DIPPED GOODS IN QUANTITIES.

manufacture of dipped goods will, doubtless, be developed to a much greater extent than ever before, and when American ingenuity is applied to this branch of the rubber business there will be small reason to fear competition from abroad. The demand for transparent and seamless rubber articles made by the dipping process has been greatly augmented during the past few years, and the production is not equal to the demand.

In this country we are accustomed to view the art of dipping as an unavoidable hand process and, therefore, there has been little advancement made in specialized dipping machines. That Germany has taken precedence in dipped goods manufacture is a well-known fact, due, without question, to the labor-saving machinery of special design used in making goods of this type. In design and construction these machines are built for both large and small production, and with every possible operation being automatically controlled in order to conserve labor and reduce the cost of manufacture.

GERMAN METHODS.

In the manufacture of nipples, according to the German practice, Upper Congo, Mozambique, Para and Ceylon rubbers are used. In order to cheapen the article, rubber substitute is often employed, but the resultant product is dull in finish and requires varnishing or enameling. Red nipples are made from Ceylon rubber, colored with sulphuret of antimony, and for black nipples Para rubber is generally used without coloring matter of any sort. Ceylon rubber is unsuited to this type of nipple, as it produces a gray-blue color in the goods.

Benzene of high volatility is recommended, as the lower grades

glass and the frames to which they are attached are all of standard size to fit the dipping machine carriers.

SCHIRM'S DIPPING MACHINES.

Seamless goods, such as toy balloons, nipples and gloves, transparent nipples, finger cots and tubes are all made on the machines

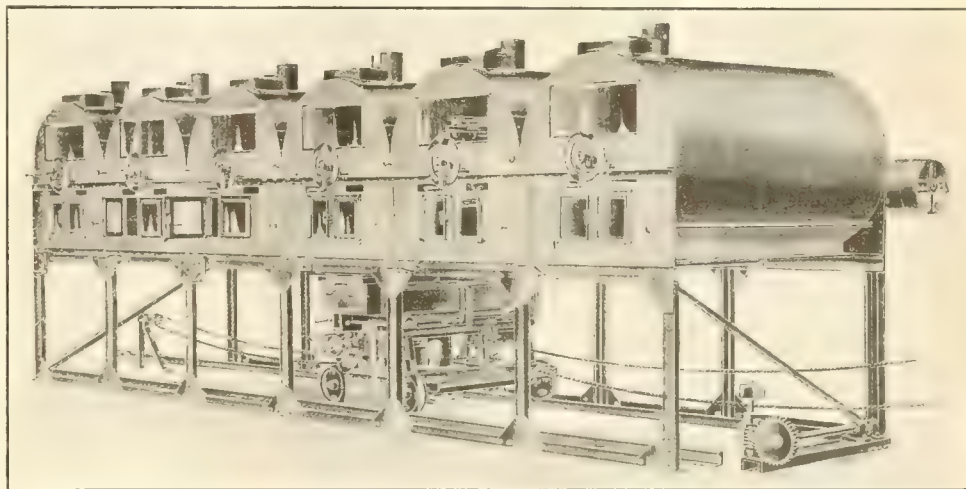


FIG. 2. MACHINES FOR MAKING DIPPED GOODS WITH MOVABLE SOLUTION CAR.

here described; however, the preparation of the solution, and the drying and final vulcanization is quite different in the production of transparent articles. The machines for dipping and drying nipples and similar articles up to 180 millimeters [7.086 inches] in length are illustrated in Fig. 1 and consist of a battery of 5 machines. The detailed description that follows applies to each machine, as they are all alike in construction and operation. Moreover, the process of dipping and drying is progressively carried on, the machines being semi-automatic and under the control of one operator.

The upper cylindrical casing encloses a horizontal shaft on

which are mounted four carriers that hold the four dipping frames. This shaft is revolved at variable speed by gearing located at the back of the machine, not shown in the illustration, and is started and stopped by a hand rod shown at the front on the left side of the casing. The lever in the center of the casing is used for turning the carrier shaft by hand when loading the carriers with the mold frames. Glass observation doors are provided in the upper part of the casing for introducing and removing the mold forms and there is also a glass window in the lower part, through which the dipping operation may be observed. Two additional glass-covered slits are located just above the lower window for observation purposes, and electric lights illuminate the interior of the casing.

The lower part of the casing is provided with doors and encloses a platform that is raised and lowered by a hydraulic ram. Two hinged covers are attached to the sides of the casing and are opened and closed automatically, covering the solution when not in use, thereby keeping it clean and preventing evaporation. A car containing the rubber solution is wheeled on the platform and the door closed. A frame holding the molds is then placed in the machine through the upper doors and attached to the carrier. The carrier shaft is turned by hand, bringing in position the second carrier to which the second dipping frame is attached, and when all four frames are in place, the doors are closed and the machine is ready for the actual dipping operation.

The speed of the hydraulic ram is controlled by a valve shown on the left of the machine, and when this is operated the ram slowly lifts the solution car and the hinged covers at the same time. After the first dipping the car is lowered and the carrier shaft turned until the wet molds occupy a vertical position. After remaining in this position for a short period to prevent the freshly-dipped molds from running, the carrier shaft is set in motion and revolved until the forms are surface dried. Then the second mold frame is dipped, raised to a vertical position and revolved until surface dried, followed by the third and fourth frames in a similar manner. When all the molds are sufficiently dried, the second dipping operation and, in fact, as many successive coatings as may be necessary, are commenced and finished in the above prescribed manner.

During the period in which this solution car is being automatically lowered and the forms revolved, the next machine may be operated, thus a skilled operator can manipulate several machines.

The drying is assisted by air heated to the proper temperature and passed through a dust removing apparatus, the circulation being regulated by suitable valves and induced by a ventilator. It is customary to devote certain machines to dipping only, and the molds, after being dipped, are removed to the machines that are used exclusively for drying purposes.

MACHINE WITH MOVABLE SOLUTION CAR.

To avoid making quantities of solution in smaller factories, where the desired output is not so great as that of the preceding machines, the apparatus shown in Fig. 2 is used. In this construction only one solution car is used that serves six machines by traveling on a track, being moved from one machine to the other by chain gearing. The hydraulic ram for lifting the solution car is operated by a hand pump and controlled by a valve shown at the front of the car. These machines possess the same mechanical features described in the machines shown in Fig. 1, and are capable of producing rubber articles 180 millimeters [7.08 inches] long. It is claimed that a skillful operator can produce 21,600 small and 10,500 large nipples on these six machines in one day.

MAKING LONG SEAMLESS GOODS.

In the manufacture of long seamless rubber articles, such as gloves, 350 millimeters [13.7 inches] long and even 450 millimeters [17.71 inches] long, the machines illustrated in Fig. 3 are used. The output of 5 machines of this type is claimed to be 3360 pieces in one day, one man being able to attend to 10 machines with a daily product of 33,600 pieces.

After the dipping process comes the edging, or bead forming operation, which, in the majority of factories, is done by hand.

The beaded goods are then placed in a moderately warm chamber and the following day they are vulcanized. The articles are cured on the molds in chloride of sulphur vapors, but thicker goods, such as nipples, etc., are first subjected to the vapor cure while on the molds, after which they are removed, turned inside out and cold cured.

As previously stated, the process of dipping and drying transparent goods is the same as in other seamless goods, but without heat, as the drying temperature should not exceed 20 degrees C. The goods are cold cured in the usual manner and afterwards dried in a cool, well-ventilated chamber.

THE EXCESS PROFITS DUTY.

Some fear exists among British rubber companies in the East that the excess profits tax may be increased and this uneasiness is not without effect on the rubber market. Companies likely to be taxed have made provision to cover excess liability, stating that part of it might be considered as a reserve to be available for distribution when the tax was withdrawn.

JAPANESE PLANTERS INVESTIGATING SUMATRA.

From the "Sumatra Post" it is learned that a representative of a Japanese association arrived on the east coast early this year, with the object of purchasing land in Atjeh and beginning rubber cultivation there.

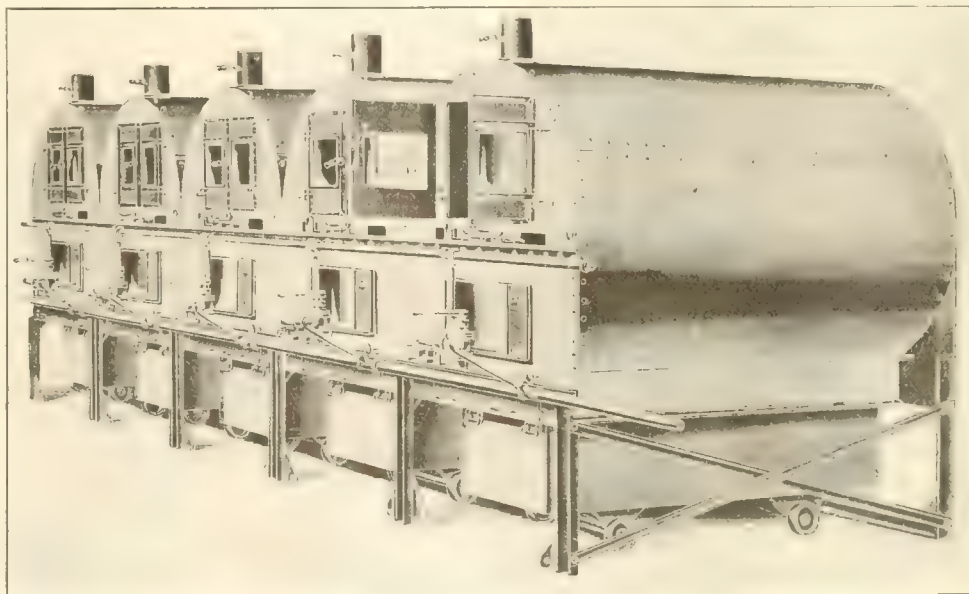


FIG. 3. DIPPING AND DRYING MACHINES FOR LONG SEAMLESS GOODS.

Power Losses in Pneumatic Tires.

THE following abstract is from a paper by E. M. Lockwood, assistant professor of mechanical engineering, Sheffield Scientific School, Yale University. The tests were made on an apparatus for power measurement at the rear tires of an automobile, and for the purpose of measuring the internal friction losses of tires and transmission system when driven by an external source, a calibrated motor was attached to the drums. The experiments have the limitation of being made on one size of tire only, and no claim is made that the entire question of tire resistance has been solved.

The method of obtaining the rolling resistance was to anchor the car with either pair of wheels on the center of the test drums, and then rotate the latter by means of the calibrated motor. Two readings were needed, one with the car on the drums and one with the car removed, when the difference in power measures the rolling resistance of a pair of wheels. The available range of speed of the motor is from 20 to 40 miles per hour at the circumference of the drums, and its maximum power is 15 horse power. The diameter of the drums is such that 300 revolutions are equal to one mile.

ROLLING RESISTANCE AT VARIOUS SPEEDS.

One surprising result of all measurements of rolling resistance at speeds from 20 to 40 miles per hour has been the very slight increase of resistance at the higher speed.

As an example of the amount of variation of resistance with speed, the following tests are reported with readings exactly as recorded:

ROLLING RESISTANCE OF FRONT WHEELS.

FRONT TIRES	Inflation Pounds.	Load Pounds.	Rolling Resistance, Miles per Hour				Average Pounds
			30	35	40	45	
32 x 4 Goodyear Cord....	60	1,120	11.7	11.7	13.8		12.4
32 x 4 Fabric.....	55	1,145	24.1	25.0	33.5	34.4	24.25
35 x 5 Goodyear Cord....	60	2,100	33.0	33.6	34.2	33.8	33.65

These cars differed considerably in rolling resistance, but in every case the speed of the car had little or no effect on the result. Rear wheel tests were made confirming the results obtained with the front wheels, hence the conclusion from these tests that the internal rolling resistance of an automobile is practically constant at all speeds up to 40 miles per hour.

DISTRIBUTION OF POWER LOSSES.

The internal power losses of the six-cylinder Chalmers chassis have been determined in this way. The tires are 32 by 4, load on front wheels, 1,145 pounds, load on rear 1,545 pounds, tire inflation 75.

POWER LOSSES IN 6-CYLINDER CHASSIS (2,700 POUNDS).

	Pounds.	Per Cent.
Front tires only	18.2	31.2
Rear tires only	17.7	30.3
Front bearings	4.7	8.
Rear bearings and transmission....	17.9	30.5
Totals	58.5	100.

Dividing the above four items into groups we find that the tires cause 61 per cent of the total resistance, while the axle bearings and transmission up to neutral consume only 39 per cent. The conclusion is that the tires are responsible for nearly two-thirds of the power lost in the car itself.

The above values are averages for speeds from 20 to 40 miles per hour, and, as before stated, the resistance changed little with the speed.

TIRE RESISTANCE AND PRODUCTION OF HEAT.

The discovery that 61 per cent of the internal power loss of this car is expended in the tires leads naturally to what becomes of this power.

It is probable that friction of the material within the tire structure is continually taking place, due to flexure at the con-

tact with the road. This absorption of work and production of heat is similar to the friction brake, except that the friction is produced by bending the fabric, not by sliding it.

Assuming the truth of these assumptions, it ought to be possible to calculate from the work absorbed the amount of heat generated; also the temperature of the tire surface when it reaches thermal equilibrium. The solution of this problem is worked out like a hot water radiator; or, rather, as the wheel is revolving, like a hot blast heater.

These tires have 5.83 square feet of surface, and the force of resistance at the circumference is 8.85 pounds. At a speed of 30 miles per hour there will be generated 1,810 British thermal units per hour, and to dissipate this heat to the air will require a rise of temperature of 39 degrees F. above room temperature, based on a heat transfer coefficient of 8 British thermal units per degree per hour.

This calculation was made in advance of any experiments, but was later verified by running one of the 32 by 4 tires for half an hour at 30 miles per hour, after which the car was stopped and the surface temperature taken with a mercurial thermometer. The room temperature was 70 degrees F., and the tire temperature was 107.5 degrees, or a rise of 37.5 degrees as compared with the calculated rise of 39 degrees F.

This experiment confirms the theory that tire resistance is caused by flexure of the material, and leads logically to the conclusion that resistance will be increased by under inflation and by overloading.

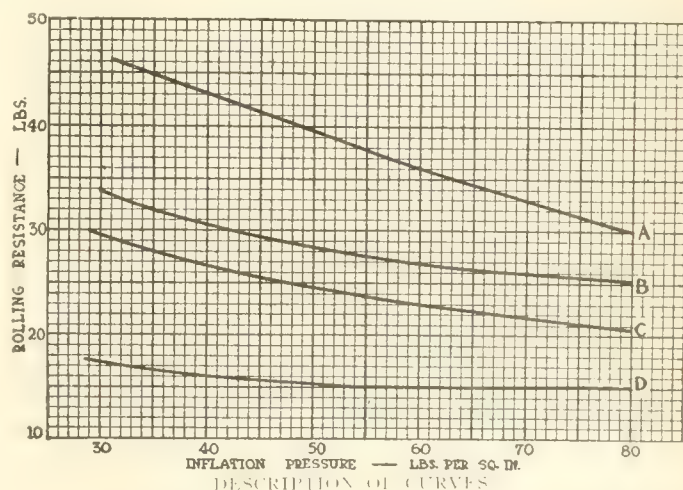
INFLATION PRESSURE AND LOAD.

Of the factors affecting rolling resistance, inflation pressure is perhaps the most important. Very considerable changes of resistance may be caused by moderate changes of pressure.

The load carried by the tire is also an important factor, which must be considered along with the inflation. It seems probable that for a given load there is a region of inflation below which the resistance increases very fast.

This relationship can best be shown by a series of characteristic curves, where rolling resistance is plotted against inflation

DIAGRAM SHOWING RELATION BETWEEN ROLLING RESISTANCE AND INFLATION PRESSURE.



DESCRIPTION OF CURVES		Load on Each Wheel in Pounds.
WHEELS.	TIRES.	
A. Rear.....	Fabric.....	772
B. Rear.....	Fabric.....	550
C. Front.....	Fabric.....	570
D. Front.....	Silvertown Cord.....	570

for a number of loads. A diagram showing an incomplete series of such characteristic curves for 32 by 4 tires, is shown herewith.

The influence of inflation pressure is clearly shown in curve *A*, which represents the rolling resistance of the rear wheels under normal load with fabric tires. With reduction of inflation pressure from 80 to 30 pounds the rolling resistance increases from 30 to 45 pounds.

When the load on the wheel was reduced, the rolling resistance decreased from 30 to 25 pounds under high inflation pressure. Reduction of pressure caused an increase of resistance in this case, but not quite as pronounced as in the first curve. Curve *B* shows the rear wheel resistance under light load.

Curve *C* shows the resistance of the front wheels under load equal to that on the rear, and displays the same characteristics as curve *B*. The uniformly greater resistance of curve *B* is due to the transmission system connected with the rear wheels.

An approximate calculation of the increase of power caused by under inflation can be made from the above experiments. From the diagram the total rolling resistance at 80 pounds pressure, front and rear wheels combined, is 51.9 pounds, while the corresponding value at 30 pounds inflation is 72.5 pounds. Adding to these values the wind resistance calculated for 25 miles per hour (30 pounds), the total car resistance for the two cases is found to be 81.9 and 102.5 pounds. The conclusion is that an increase of power amounting to 25 per cent may be caused by very much under-inflated tires.

CORD VERSUS FABRIC TIRES.

Only a limited number of tests of cord tires have been made under conditions permitting accurate comparison with fabric tires.

One such comparison is shown on the diagram, curve *D*, where a cord tire, 32 by 4, was tested under exactly the same conditions on the front wheels for the whole range of pressures.

The characteristics of this cord tire are, greatly reduced resistance loss and ability to run at low inflation without much increase of resistance.

While these experiments point to the value of cord tires for reducing tire losses, more numerous and exhaustive tests are required covering a wider scope.

S. A. E. HAS A NEW MEANING.

On April 19 the Society of Automobile Engineers became the Society of Automotive Engineers, as a result of the amalgamation of the membership of the American Society of Aeronautic Engineers, the Society of Tractor Engineers and engineers of company members of the National Association of Engine and Boat Manufacturers. "Automotive" is, in a sense, a new word made necessary to describe comprehensively the various forms of self-propelled mechanical apparatus, such as aircraft, watercraft, passenger and freight motor cars and tractors of various types. This word, which is sound etymologically, has been understood and accepted by the public with surprising rapidity in view of its novelty. Both the words "automotive" and "engineer" are very emblematic of modern progress and of the most advanced types of transportation in peace or war.

A Washington office of the society will be opened in the Munsey Building in connection with the Council of National Defense as soon as arrangements can be made. This action was brought about by the closer co-operation of the society with the various Government departments, which work is increasing every day.

The society has been active in classifying its membership as to capability for Government service industrially or with the troops. Over two thousand of the members have filled out blanks indicating their experience in designing and producing engines and other parts for airplanes, motor trucks, watercraft of various types, tractors and munitions. Three or more grades of men have been classified according to the following callings: Chief engineers, assistant engineers, draftsmen, electrical engineers, superintendents, metallurgists, inspectors, apparatus testers,

laboratory engineers, truckmasters, purchasing agents, service men, tool designers, executives, chemists and fuel and lubricant engineers. Trained in the highest speed industry the world has ever known, to get results without precedent as to equipment, material or time available and to assume large responsibilities, the members of the S. A. E. are well qualified to solve any automotive problems on which the Government may desire assistance. They are quite ready and willing to do anything that will assist the United States, serving in any capacity in which their country may see fit to use them at any time.

Because of war conditions, the summer meeting of the society, scheduled to be held the last week in June at Ottawa Beach, Lake Michigan, has been called off by the Council of the society, it having been found that each day finds the engineers more and more engrossed in war activities, and correspondingly fewer of the members with spare time for such a meeting. Instead of four days at Ottawa Beach it has been decided to hold a one-day meeting in Washington, D. C., on June 25. Washington was selected because many Government departments are closely associated with the work of the society.

The United States War Department, as a result of collaboration with the Society of Automotive Engineers, has revised its specifications for military motors, on a more practical basis, and less severe in several unimportant details. For the 1½-ton trucks the specifications call for 36 by 4 inch demountable tires.

TIRE PRICES ADVANCED.

The expected advance in tire prices has arrived. For the second time since January 1, the manufacturers have felt the necessity of marking up their price schedules, on account of the extra cost of materials and labor. In January, tire prices were increased, about 10 per cent on casings and 5 per cent on tubes. The difficulty of securing raw cotton of proper quality and consequent high cost of tire fabrics, is given as the principal cause of present increase. Crude rubber prices have been high, but not enough to greatly increase manufacturing cost.

The various companies have acted independently in this advance, but in nearly every case the increase is around, or exactly 10 per cent, and this rate applies to both tubes and casings and to all kinds, including Ford sizes, pneumatic, motorcycle and solid or truck tires. The variations from this 10 per cent include Firestone tires, some of which have advanced 12½ per cent, and Goodrich Q. D. and Silvertown tires, 15 per cent. Mechanical goods have also advanced 10 per cent.

AMERICAN TIRES IN BRAZIL.

American tire manufacturers lead in the exports to São Paulo, according to the commerce reports. Before the war, France supplied most of the tires used in this market, while United States exports were less than 5 per cent. In 1915 Italy led, but had to cede her place to America in 1916.

The imports of pneumatic tires for the three years preceding 1916 and the first nine months of 1916 were:

Country of origin.	1913.	1914.	1915.	Jan. 1 to Sept. 30, 1916.
Belgium		\$6,157		
France	\$188,30	167,363	83,577	84,156
Germany	34,649	23,330		
Great Britain	777	21,510	2,702	111
Italy	46,128	8,559	186,800	166,007
United States	11,40	9,18	167,876	221,257
All others	876	2,416		
Totals	\$281,560	\$294,350	\$394,094	\$433,531

It is understood that by a recent agreement between the representatives of certain American manufacturers and European factory agents, tire prices in São Paulo, as in Rio de Janeiro, will be maintained on a fixed non-competitive basis. There is a small local production of solid tires, but as the work is done chiefly by hand the industry cannot yet compete with the imported article.

Trade Acceptances for the Rubber Goods Dealer.

By R. R. Voorhees.

TRADE acceptances are being used more and more by business houses on account of their value to both the buyer and the seller of goods. And the future will see an increasing use of these handy instruments of business. Only the larger concerns now use trade acceptances, but as their value becomes more generally known the smaller concerns will adopt them until finally they will be as familiar in the business world as are checks to-day. And for this reason it would be well for every rubber goods dealer to know just what they are, how they operate and the advantages they offer.

But before their operation is explained, it might be well to quote the definition of a trade acceptance as given by the Federal Reserve Board in one of its recent circulars, as follows: "A bill of exchange . . . drawn to order, having a definite maturity and payable in dollars in the United States, the obligation to pay which has been accepted by an acknowledgment, written or stamped, and signed across the face of the instrument by the company, firm, corporation or person upon whom it is drawn; such agreement to be to the effect that the acceptor will pay at maturity, according to its tenor, such draft or bill without qualifying conditions." And it might also be well to state that trade acceptances were created by the Federal Reserve Act.

The operation of trade acceptances is very simple. When a purchaser buys goods on time; that is, does not pay cash for the merchandise, the seller of the goods includes with the invoice a blank acceptance form, upon which has been written the number and amount of the invoice and also the date of maturity. In other words, if the purchaser buys on 30, 60 or 90 days' credit, the date of maturity will be 30, 60 or 90 days, as the case may be. If the buyer of the goods wishes to give an acceptance covering his purchase he fills in the date, signs it and designates the bank through which the amount is to be paid at maturity. This is then sent back to the seller of the goods, and if the seller so desires, he can sign this acceptance and take it to his bank, discount it and in that way obtain the money at once for goods that have been sold on time. The discount rate is smaller than it is on one name paper, since this is two name paper, both the buyer and the seller having signed it.

Of course, the advantages to the seller of the goods are most apparent. But there are real reasons why the buyer of goods should do credit buying on a trade acceptance basis instead of on the old style open account system that is now in general use.

At present, cash customers are given all the advantages in business. When they make a purchase and pay cash for it, they receive what is termed a cash discount and in the course of a year this amounts to considerable. But with the credit customer it is different. He pays the full amount of the bill because the seller of the goods is forced to wait 30, 60 or 90 days for his money and on that account cannot afford to give

any discount. But as trade acceptances come into more general use there will be a marked tendency to allow a small discount to buyers of goods who give trade acceptances for their purchases. The sellers of the goods will be able to realize on the sale at once, minus a small discount, and on this account can afford to give a discount if the buyer will give a trade acceptance.

In addition to the possibility of obtaining a discount there will be a tendency to lower the net prices of the goods purchased. As the seller of goods gets more of his customers to give trade acceptances, covering their purchases he will be able to lower the net price of the goods he sells and in that way the buyer will be given an advantage that he did not have before the use of trade acceptances was possible.

Overstocking is one of the chief reasons for failure. Quite unintentional, to be sure, but still a fact, the average dealer is

too apt to take on stock with the hope that he will be able to sell it instead of being confident that he can dispose of it. He has it in his place for a while and then, perhaps, finds that it does not sell. Much of this sort of buying soon puts him out of business. But if he gave a trade acceptance

for everything that he bought on credit he would use more judgment in making purchases.

Giving a trade acceptance would not curtail the amount of goods that a seller would allow a purchaser to buy because by so doing the purchaser would indicate himself to be a man of business judgment who fully realized his obligations. The seller would feel that any purchases made under the new method of doing credit business were purchases of merchandise that the buyer really needed and on this account would be willing to allow the buyer to have it.

In case the buyer of the goods could not meet the trade acceptance when it was due, the seller would, in most cases, be lenient with him, since when the purchase was made, the buyer gave to the seller what he so much desired.

Some buyers feel that a trade acceptance is a note, but such is not the case. Trade acceptances can be given only for obligations arising out of the purchase of merchandise, and for old accounts or for money loaned. On the face of the acceptance is written the number and amount of the invoice, which proves that it is for merchandise that has been bought. Instead of a trade acceptance harming the giver, it really helps him by placing him in a preferred credit class and making him appear as one who wants to do business on the highest business plane.

Trade acceptances are new and many do not realize their advantages. Every rubber goods dealer will do well to ask his bank about them and to ascertain if the firms of which he buys goods use them in their business. Trade acceptances are the coming method on which credit business will be done in this country, and it is only a matter of a short time when they will be in almost as common use as checks are to-day.

TRADE ACCEPTANCE

Accepted April 5, 1917

Payable at Bank No. 629, St. Louis, Missouri

To J. R. Doe, St. Louis, Missouri

Signature of acceptor J. R. Doe

Amount One Hundred Ten & 50/100 Dollars.

New York, N. Y., April 2, 1917 \$ 110 50/100

pay to the order of "Ourselves"

The obligation of the acceptor hereof arises out of the purchase of goods from the drawer.

A TRADE ACCEPTANCE PROPERLY FILLED OUT.

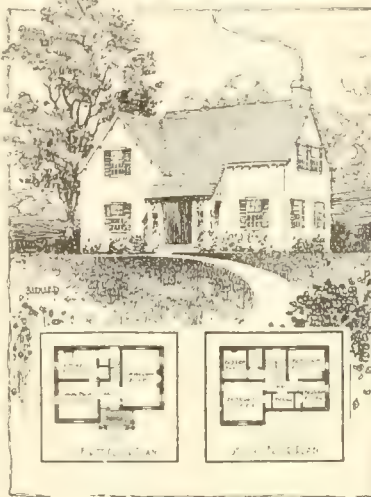
Financing an Industrial Village.

By John Barnard, Architect.

WHENEVER the better housing of employes comes up for discussion, the financing of such a project so as to enable them to purchase their homes on a partial payment plan is seen to be a problem of considerable importance. How this may be done on a cooperative basis is well illustrated by Good-year Heights.

This development con-sists of 400 acres near the plant of the Rubber Co., Akron, Ohio, and a 28-acre park and athletic field affording land and water recreation facilities both summer and winter. The tract is being handsomely laid out with streets, sidewalks, small parks and playgrounds, trees and shrubs, and will eventually provide pleasant modern homes for 10,000 persons. On the 100 acres now developed 300 houses have already been built and arrangements have been made for the erection of 500 more this year. Like those previously constructed, about half of this number will be built by

sists of 400 acres
Goodyear Tire &
including Blue Pond



A PICTURESQUE SINGLE HOUSE.

provide homes within the range of every purse. Every street, however, is restricted as to minimum cost of all houses upon it.

The original cost of the land to the company and the various items of development are shown by the accompanying table:

Cost of property.....	\$30,000.00
Excavating 100,000 yards.....	27,175.00
Curb for brick pavement, 11,796 feet.....	3,538.00
Gravel roads, 36,978 square yards.....	16,235.00
Sanitary sewer system.....	21,000.00
Storm water system.....	8,000.00
Main drain.....	8,510.74
Bridge (concrete).....	9,729.66
Planting trees and shrubs.....	2,500.00
Office and engineering expense, architects, etc.....	21,000.00
Blue Pond drain.....	2,932.00
Instruments.....	445.00
Sidewalks, 265,531 feet.....	23,153.00
Grading about houses, top soil and seeding.....	13,000.00
Miscellaneous (ditches, surveyors' monuments, etc.).....	1,882.60
Curbs and gutters for gravel roads, 35,958 feet.....	21,574.00

Total cost\$210,675.00

Total number of lots averaging 50 x 110—125 feet..... 430

Thus the total cost of each lot is nearly \$500, but prices have been set at \$240 to \$760, according to desirability of location. The idea is to sell the property to employes at cost in so far as that can be estimated, and the actual payments are according to the accompanying tabulation.

Two mortgages are placed upon the property. The first, for about one-half the value, is carried by a large life insurance company, while the second, covering the balance of the purchase price, is carried by the Goodyear company. The semi-monthly payments specified are sufficient to pay off the second mortgage in 12 years and the first mortgage in 3 years more, the rate of interest being fixed at 6 per cent. Larger payments may be made or the full cash price paid if desired to save the interest. A semi-monthly assessment is made to provide for taxes as they come

Cost.....	\$1,584.00	\$2,682.00	\$2,288.00	\$2,699.00	\$2,801.00	\$2,808.00	\$2,845.00	\$2,896.00	\$2,998.00
Real Estate Value.....	2,480.00	3,352.50	2,860.00	3,373.75	3,501.25	3,510.00	3,556.25	3,620.00	3,747.50
Semi-Monthly Payments.....									
First 5 years.....	11.27	15.25	13.01	15.34	15.92	15.97	16.16	16.54	17.06
Next 7 years.....	7.31	9.86	8.45	9.88	10.24	10.26	10.47	10.67	11.03
Last 3 years.....	3.88	5.19	4.44	5.22	5.43	5.43	5.53	5.22	5.75
15 years.....									

contract for the company and sold to employes, and the remainder at the request of employes according to their own plans, subject to the approval of an architectural board, general architectural harmony being desirable and certain restrictions necessary to the common good of the community. Both plans have their advantages, but the former is obviously cheaper because of distinct advantages in quantity buying and distribution of materials. The architects, Mann & McNeille, have developed English cottage types of harmony and individuality, yet varying considerably in size, arrangement and constructive materials, the idea being to

due, but for its own protection the company carries all fire and tornado insurance until the full purchase price has been paid. In addition, arrangements have been made for groups of 100 employes who so desire to take out life insurance on a diminishing scale which will assure the home to dependent families in the event of the employee's death. This increases the semi-monthly mortgage payments very little, the amounts ranging from 30 cents at the age of 21 for each \$1,000 to 95 cents at the age of 55.

To prevent speculation, the payments for the first five years are based not upon the cost, but upon the real estate value, which

is 25 per cent higher. At the end of five years, however, if the worker is still with the company and has kept up his payments, the difference between the two values, together with the interest thereon, is canceled and credited to him, his payments thereafter being on the basis of the cost price.

[This is the third of a series of articles devoted to the better housing of employes.—Editor.]



TWO-FAMILY SEMI-DETACHED AND SINGLE HOUSE TYPES AT GOODYEAR HEIGHTS.

What the Rubber Chemists Are Doing.

COEFFICIENT OF VULCANIZATION AND THE STATE OF CURE.

Dr. Henry P. Stevens discusses in "The India Rubber Journal" (February 10, 1917) the paper of Dr. O. de Vries on the above topic, THE INDIA RUBBER WORLD (March 1, 1917). Doctor Stevens remarks that if physical tests on vulcanized rubber are to be of practical value in order that a decision may be made regarding the manufacturing value of any particular specimen, these tests must be carried out either on a rubber cured suitably to manufacturing conditions, or if cured beyond this stage (over-cured) there must be available some method by which the tests on the over-cured rubber may be correlated to tests on correctly cured rubber. No such method of calculation is at present available, as the necessary relationship has not been worked out between stress-strain curves and coefficient of vulcanization. A correctly cured rubber is one fully cured from the manufacturer's standpoint, not beyond that point at which aging is satisfactory. Otherwise the specimen is over-cured.

Rubber is a colloid, and shows the phenomena of hysteresis. Its physical properties at any moment depend partly on its previous history. It is therefore obvious that no conclusions should be drawn from any stress-strain curve without taking into consideration the previous history of the specimen. Dr. Stevens agrees with the statement of Dr. de Vries that "the percentage of combined sulphur is quite independent of the state of cure as expressed by the position of the stress-strain curve," but adds that the "state of cure" cannot be adequately expressed under present conditions by the stress-strain curve. It may, however, be possible when the "standard curve" or other methods are correlated to manufacturing conditions and the tests carried out on rigidly standardized lines.

Vulcanization is essentially a chemical process; so also is the subsequent decomposition of rubber which has been over-cured, and hence the proportional relationship of rubber and sulphur in combination is the best guide for a stable product, the first essential in the manufacture of rubber goods.

Messrs. Schidrowitz and Goldsborough have evidently correlated their stress-strain curve method to manufacturing conditions, as shown by their remarks on the subject in "The India Rubber Journal" (March 3, 1917).

Discussing the case in which the "coefficient" (according to Stevens) may be wrong, but the mechanical properties correct, Schidrowitz and Goldsborough note that the question at issue is whether state of cure or correct cure is to be judged by the chemical or the mechanical properties of the vulcanized article—by sulphur combined with the rubber or by the stress-strain curve. Their answer is that *ultimately* the attributes or quality of vulcanized rubber must be judged by the physical or mechanical properties.

Certain low-curing rubbers require, in order to acquire the necessary mechanical properties, a protracted cure, and in the course of such cure will combine with more than three per cent of sulphur, and in general slow curing rubbers deteriorate more rapidly than rapid curing goods, and will not age well because of the excess of combined sulphur, and possibly also by reason of the long heating necessary.

The physical and mechanical effects which vulcanization has upon rubber are shown in the clearest manner by the stress-strain curve method, and there is no other known method whereby the mechanical aspect of vulcanization can be systematically and accurately followed and measured.

Schidrowitz and Goldsborough remark in conclusion:

In view of the apparent lack of comprehension concerning stress-strain curves, we take this opportunity of briefly re-stating some of the more important points:

1. The "type" of the curve is *independent of the state of cure*. It therefore connotes inherent properties.
2. As the "type" varies for different rubbers, its determination affords a valuable method of comparison in regard to important mechanical properties.
3. We obtain a graphic representation of the progress of vulcanization.
4. We are able to cure to a definite mechanical condition, and to estimate the rate of cure necessary to attain that condition.
5. Having settled the position of the curve for a given rubber mixing we are able to control the vulcanization of the factory product.

Much else may be done with and deducted from the stress-strain curve method. In more propitious times the authors propose to recur to the subject at length.

While agreeing that stress-strain curves are of great value, intelligently applied, Dr. Stevens holds that the coefficient of vulcanization is the safest guide as to the state of cure.

VULCANIZATION BY AGENTS OTHER THAN SULPHUR.

Reviewing the recently published work of Ostromyslenski, Dr. H. P. Stevens presents some of his results in the "Journal of the Society of Chemical Industry" (February 15, 1917).

VULCANIZATION WITH NITROBENZENE.

Ostromyslenski's results (published in THE INDIA RUBBER WORLD, November 1, 1916) have not been duplicated and his claim cannot at present be accepted.

The effect of vulcanization has been obtained with mixes of rubber with di- or trinitrobenzene in the presence of bases such as litharge or magnesia without the least difficulty. Trinitrobenzene is far more efficient than dinitrobenzene. Mononitrobenzene, so far, has not given satisfactory results. Figures are given obtained with 100 parts pale sheet rubber, eight parts litharge and varying proportions of *m*-dinitrobenzene and sym-trinitrobenzene. The specimens were cured in a steam vulcanizer at 135 degrees C. for times varying from 5 to 120 minutes.

The results of the physical tests show that the products so far obtained possess relatively poor physical qualities. The best results were obtained with the larger proportion (four parts) of trinitrobenzene, but even in this case the strength as measured by the tensile product is not much more than half that obtained with a properly vulcanized rubber and sulphur compound.

The color of rubber vulcanized with nitrobenzenes is brown to black. Viewed by transmitted light in a thin stretched sheet it is yellow-brown and translucent or almost transparent. Litharge can be replaced by magnesia and probably by other basic oxides with similar results.

VULCANIZATION WITH BENZOYL PEROXIDE.

The discovery of peroxides as vulcanizing agents to replace sulphur was announced by Ostromyslenski. Of the peroxides employed, most of the experiments were made with benzoyl peroxide.

As is well known, benzoyl peroxide, like other peroxides, is very explosive, and consequently cannot be handled in the dry state. For these experiments it was used in the form of a paste with about its own weight of water. In this connection it presents no difficulty when added to the rubber on the mixing rolls, and the small amount of water added is lost by the time the mixing is complete.

In the first series of experiments three mixes were made of the same plantation crêpe rubber with the following percentages of benzoyl peroxide (reckoned dry): A, 0.33 per cent; B, 1.33 per cent; C, 6.67 per cent.

Mixings A and B gave very weak rubbers. Nevertheless the influence of even 0.33 per cent of benzoyl peroxide is clearly marked. Mix C gave the best results, the vulcanized

samples having approximately one-third the strength of a similar rubber vulcanized with sulphur in the same heat. Samples from mix *B* occupy an intermediate position. All the vulcanized samples are very pale in color, quite as pale as the original raw rubber. Those of mix *C* have a very attractive appearance. They are quite transparent and resemble some of the palest cold-cured sheet prepared from plantation crêpe.

In benzene the vulcanized mix *A* dissolves in a few hours in similar manner to raw crêpe. Mix *B* swells enormously, but does not dissolve. It remains a soft gelatinous lump in the solvent. Mix *C* behaves the same as an ordinary vulcanized rubber, swelling considerably, but retaining its original form. It may therefore be said that the change brought about by heating with benzoyl peroxide is exactly similar to that produced by sulphur and that the products formed have similar properties. The proportion of benzoyl peroxide required to give a fairly complete vulcanizing effect is similar to the proportion of sulphur which would be required for the same purpose, but the vulcanization with benzoyl peroxide is brought about in a much shorter time. Thus, in the above experiments and also in those published by Ostromyslenski, vulcanization is fairly complete in 10 or 15 minutes at 130 to 135 degrees C. with 4 to 6 per cent of benzoyl peroxide, whereas vulcanization would hardly have begun with a mix containing 5 to 6 per cent of sulphur and would require two to three hours for completion. Attempts to obtain satisfactory vulcanization with smaller proportions of benzoyl peroxide, but vulcanizing for longer periods, have not been successful. Thus, with 1.33 per cent of benzoyl peroxide better results were obtained when vulcanizing for 30 minutes than for 60 minutes. Further experiments are in progress.

ORGANIC VULCANIZING ACCELERATORS.

In a communication in the "Journal of the Society of Chemical Industry" (February 15, 1917), Dr. Spence says, regarding organic vulcanization accelerators, that, according to Ditmar, Gottlob and King, the discovery of the principle of vulcanization, whether of natural or of synthetic rubber, by means of organic catalysts dates from the disclosures of the Elberfeld Farbenfabrik in November, 1912. This is probably true so far as Europe is concerned, but not so with regard to America. Dr. Spence states that substantial proof of this assertion is to be had from an analysis of his own previously published work on the subject of vulcanization.

In the "Kolloid Zeitschrift" (volume 10, page 303-305, 1912), more than six months before the Eberfeld Farbenfabrik made application for their first patent on this subject, Dr. Spence described certain experiments, the significance of which passed apparently unobserved. The reference follows: "More than a year ago we prepared samples of two carefully chosen mixings. Both mixings were made from partially purified rubber with about 9 per cent of sulphur. In order to make the investigation as comprehensive and complete as possible, the two mixings were purposely chosen so that two quite distinct types of compound as different as possible in their properties were obtained. The first was a slow-curing compound deteriorating rapidly; the second, on the other hand, was a quick-curing mixing which we knew from experience would resist deterioration indefinitely . . . Two compounds of the same general character as No. 2 were prepared; both these compounds contained about 9 per cent of sulphur and were free from mineral compounds."

Dr. Spence then states:

As a matter of fact, the first of these two compounds actually contained 1 per cent of piperidine, the very substance referred to in the German patent of November 16, 1912. The formula for the mixing was as follows: Plantation Para, 100 parts; sulphur, 10 parts; piperidine, 1 part. Without the use of piperidine in this mixing the results given in the communication referred to would have been utterly impossible.

In regard to the discovery of vulcanization of synthetic

rubber by means of organic accelerators, also credited to Elberfeld Farbenfabrik, the vulcanization of these products by this means was actually carried out and successfully accomplished by me both for isoprene-caoutchouc and for the dimethyl caoutchouc from pinacone at a time when the large industrial concerns in Germany engaged in the study of the synthesis of india rubber were in the dark as to their lack of success in the vulcanization of their products. The proof of this assertion and the complete vindication of my position with reference to the subject in general I am content to leave over until a later date. At that time I will also bring evidence to show that even the reagents claimed by Peachey (English patent 4,263 of 1914) were known to me and had been used by me both scientifically and industrially several years before his application was applied for.

VULCANIZATION.

The following remarks on the chemistry of vulcanization are condensed from a study of the subject by André Dubosc ("Le Caoutchouc & la Gutta-Percha," January, 1917). In discussing the work of Stevens, the author amplifies his views on vulcanization, published two years ago.

The early inventors and rubber workers practiced vulcanization purely as an art, and were interested solely in the industrial results. Parkes seems to have seen a little more clearly than others the problem of vulcanization as a science. The first notable advance in the study of vulcanization was the theory of Dr. Carl Otto Weber, who held that sulphur in saturating the double bonds either of one molecule, in the case of ebonite, or of a more or less extended polymer, in the case of different qualities of soft rubber, determined and stabilized the physical properties of the crude rubber complex. Although of the greatest interest, Weber's theory was incomplete, because it did not take into account the state of polymerization of sulphur used in vulcanization, nor did it explain the function of litharge and magnesia in this connection.

Subsequently, Oswald put forward this theory that vulcanization is an absorption and not a chemical phenomenon. His views have found many adherents, somewhat displacing the well-founded chemical theory of Weber, although the latter gains confirmation by the latest work of Bysow, and of Stevens on the influence of nitrogenous products and resinous substances in vulcanization, indicating that the proteins contained in rubber are very important factors in considering the properties that rubber acquires when vulcanized. The work also of Baritt supports the new ideas of beneficial influence exercised on rubber by the proteins, hitherto erroneously considered as impurities. In fact, the proteins are now known to play the part of a catalyst in the process of vulcanization.

The effect of the addition of foreign nitrogenous substances to rubber has been studied, with positive results.

The function of rubber resins in vulcanization is important, the most striking result being the deterioration of the rubber after vulcanization, when all the resinous elements have first been eliminated. This fact is explained as follows:

It has only been possible to get the colloidal sulphur necessary for vulcanization, in the absence of resins, by a partial decomposition of the rubber which has been altered and depolymerized.

The formation of water accompanying the production of colloidal sulphur explains the need for an absorbent, like whiting, in mixtures, to prevent porous rubber.

It has been demonstrated experimentally that when rubber resins and the proteins, previously separated from the rubber, are heated at temperatures approaching those of vulcanization (120 to 150 degrees C.), it is possible completely to convert the sulphur added into sulphydric acid.

When a mixture of litharge, magnesia, oxide of zinc and sulphur is heated either in air or under oxidizing influence, metallic sulphur and sulphurous acid are constantly produced. When the latter is made to react on sulphydric acid resulting from the preceding reaction, colloidal sulphur and water are formed.

Without establishing the theory just explained, Stevens summarizes the following results of his experiments:

1. Chemically pure rubber vulcanizes badly.
2. The presence in rubber of foreign albuminoids, like caseine, facilitates vulcanization.
3. Vulcanization was facilitated by the presence of non-nitrogenous hydrocarbons, like starch.

In explanation of the phenomena discussed by Stevens, Dubosc says, that the proteins and resins acting on the sulphur generate sulphydric acid, while the oxidized rubber generates sulphurous acid. These acids react on each other and produce colloidal sulphur, which alone is susceptible of combination with rubber.

In proportion to the quantity of insolubles, proteins and oxidized rubber, a larger or smaller quantity of polymerized sulphur is converted into colloidal sulphur. The rest of the polymerized sulphur remains as free sulphur.

The whole secret of the action of the impurities of rubber and of materials like litharge consists in the transformation resulting in colloidal sulphur.

METHOD OF ANALYSIS.

DETERMINATION OF COPPER BY ACETYLENE.

METHOD by C. B. Clark, Somerset Rubber Reclaiming Works. The salt to be analyzed is dissolved in water with the addition of ammonium hydrate, and heated a short time on a water bath. Precipitation of copper acetylide is effected completely, even in the cold, by the addition to the solution of acetylene in excess. The precipitate is collected, washed and decomposed by digestion in hot dilute nitric acid. The carbonaceous residue is removed by filtration. The filtrate is evaporated to dryness, ignited and the ash weighed as copper oxide (Cu O).

This method is particularly useful for separation of zinc from copper, as the salts of zinc are not decomposed by acetylene.

CHEMICAL PATENTS.

UNITED STATES.

PLASTIC RUBBER COMPOSITION. A substitute for sealing wax comprising resin, caoutchouc, sulphur, white lead and petroleum spirit as a solvent for the resin and caoutchouc. [Ramon Castells, Barcelona, Spain. United States patent No. 1,219,536.]

SOLID TIRE. A solid elastic tire made of a composition of rubber, 34 parts; lithopone, 50 parts; sulphur, 6 parts; litharge, 2 parts; and iron oxide, 2 parts. [Arthur Nixon, Rusholme, Manchester, England. United States patent No. 1,221,083.]

THE DOMINION OF CANADA.

RUBBER SUBSTITUTE. Fish oil, sulphur, five to one, and a metallic oxide, combined by heating from 175 to 220 degrees C., and subsequent heating of mass under relatively high pressure at 155 degrees C. [Morton Gregory, Tacoma, Washington. Canadian patent No. 173,601.]

FILLER COMPOSITION FOR TIRES. A composition comprising crude rubber, 34 parts; infusorial earth, 14 parts; rosin oil, 1 part; flour of sulphur, 4 parts; air slaked lime, one-quarter part; carbonate of ammonia, 2 parts, and baking soda, 1 part. [Edward L. Sherbondy, assignor to The Aero-Cushion Tire Co.—both of San Jose, California. Canadian patent No. 173,866.]

CALIFORNIA MAGNESITE.

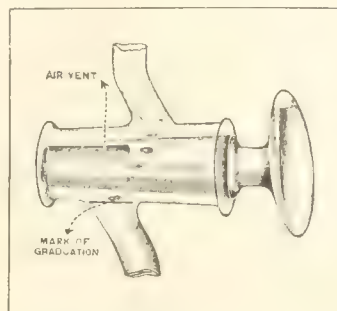
Magnesite is being mined near Rutherford, California. In quality it compares with the Austrian magnesite. The calcined product contains over 86 per cent of magnesia, not over 3 per cent of lime and from 4 to 7 per cent of iron and alumina. After the war calcined magnesia from this California source will probably appear in the market as a compounding ingredient.

Secretary Olsen, of the American Institute of Chemical Engineers, is sending out a notice that the ninth semi-annual meeting of that body will be held in Buffalo, New York, June 20-22.

LABORATORY APPARATUS.

AUTOMATIC PIPETTE.

THE Lowy automatic pipette presents several advantages. There is no necessity of adjusting, maintaining or manipulating the volume of liquid. This is controlled by the automatic stop cock.



The exact measured volume of liquid is automatically delivered.

Inaccuracies due to parallax and personal equation are eliminated.

There is no possibility of fingers bringing contamination to the mouth.

The pipette is exceedingly easy to manipulate. The liquid is drawn up until it just

passes the graduation mark. The stopper is turned 90 degrees. The exact measured volume of liquid is thus shut off from the excess drawn into the pipette. By again turning the stopper 90 degrees, air pressure expels the correctly measured volume of liquid out of the pipette. [Palo Co., 90 Maiden Lane, New York City.]

CHEMICALS FROM JAPAN.

According to information from the British Commercial Attache at Yokohama, the Japanese Minister for the Interior has issued an order permitting the exportation of certain chemicals from Japan. Among these are sulphur, wax, ammonium carbonate, oil of turpentine and castor oil.

CHINESE VINEGAR AS A COAGULANT.

Chinese vinegar has been suggested as a coagulant, but Professor B. J. Eaton, of the Department of Agriculture, Federated Malay States, gives it as his opinion that there is no especial advantage; as far as results are concerned, in using it in place of acetic acid. This vinegar, he states, is probably prepared by acetic fermentation from rice. It differs from English and other vinegars only in being colorless. He finds that the cost, based on the acetic acid content, is far greater than ruling prices of glacial acetic acid.

A NEW METHOD OF COAGULATING RUBBER.

An interesting discovery was recently made at the Lowmont factory in the Kalatura district of Ceylon. Ordinary rubber is prepared there with the aid of acetic acid only, or with acid and sodium bisulphate. On the Lowmont plantation 5 ounces of sodium bisulphate are put into every 25 gallons of latex and water, more or less equally mixed. The liquid is allowed to settle for 12 hours when 20 per cent of dark coagulated lumps is formed. The remaining purified latex is then strained and 5 ounces of acetic acid added to every 25 gallons, when coagulation promptly takes place. It is said that the rubber treated in this manner has, so far, almost always brought top market prices, while the dark rubber made of the lumps has brought only a few cents less than the other, if properly made.

ACETONE FROM THE MAHWA-TREE.

Although acetone is chiefly employed in the manufacture of munitions, yet its use as a solvent in the rubber industry makes it interesting to learn that a new source of this chemical has been found. In the past, acetone was extracted chiefly from wood, maize and starch, but two English scientists in Hyderabad, India, have discovered that the flowers of the mahwa tree contain a larger quantity of acetone than is present in any other vegetable substance—ten times more than in wood. The Director-General of Ordnance in India reports it to be the best source of acetone yet found.

New Machines and Appliances.

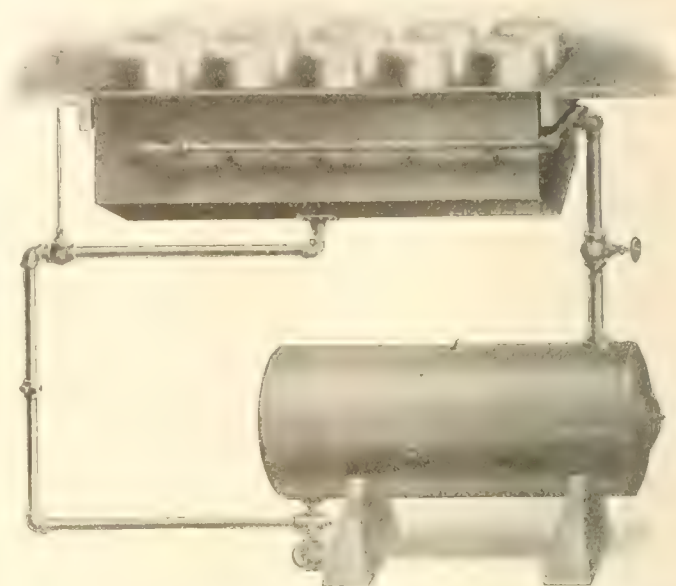
RUBBER SOLUTION MACHINE AND ASBESTOS COMPOSITION MIXER

THE adaptation of the principle of the "Universal" type of mixing machines to the construction of rubber solution and asbestos composition machines has proved to be very successful. By specially designed blades the materials to be mixed are thoroughly kneaded and kept in constant motion in the trough, resulting in a homogeneous product within a comparatively short time.

The solution mixer shown in the illustration is built in two different types, one with gears on one side that is used for medium and soft grades of rubber, and the other with gears on both sides of the trough and adapted for hard grades of rubber. The trough is made of sheet iron and the machine is provided with a hinged wrought iron cover to prevent the escape of solvent and with corners or internal lips that the material may be discharged into an ordinary sized vessel.

If desired the machine may be provided with an arrangement to drive it at a slow speed or a high speed. The slow

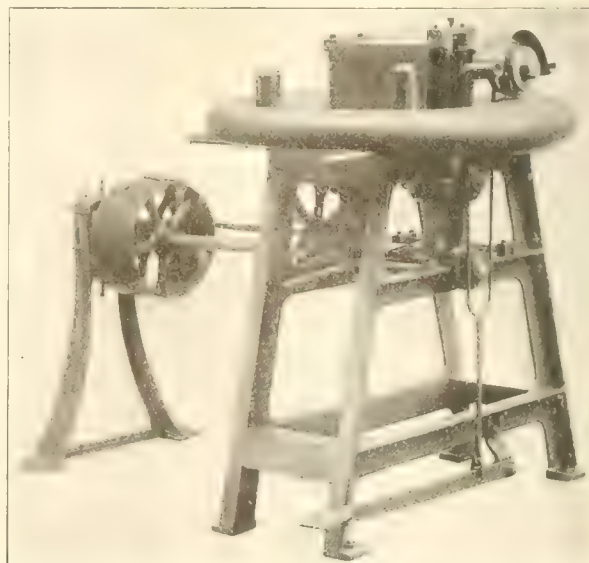
starts at once and is maintained by a patented system of circulation which continues without attention until the cakes are completely dissolved.



Solutions of any required strength may be made without the use of steam or compressed air and there are no moving parts requiring power for their operation. No attention is necessary other than the initial charging of the apparatus which will automatically effect complete solution of the caustic in about five hours. The dissolver can also be charged at night with the assurance that the solution will be ready for use in the morning. For hot solutions a thermo syphon attachment is provided. [The Walter E. Lummus Co., Boston, Massachusetts.]

MACHINE FOR CUTTING BEADS, BELTING AND PACKING.

The development of new machinery of special design continues to mark the steady progress being made as the rubber industry expands.



The accompanying illustration is that of a recently developed machine which may be used for cutting belting and other heavy

speed is generally used at the beginning of the operation when the material is of a stiffer consistency, and the fast speed for the end of the operation, when the material is more of a syrup-like consistency. Furthermore, the trough may be jacketed for heating or cooling purposes.

For compositions containing asbestos that are used in making Klingerit type packings a special machine is constructed. The trough of this type is made of cast iron, has a toothed saddle and the blades are protected with serrated shoes. This arrangement is of great advantage as it separates the fiber of the asbestos without breaking it. [Werner & Pfeiderer Co., Saginaw, Michigan.]

AUTOMATIC CAUSTIC SODA DISSOLVER.

In THE INDIA RUBBER WORLD of January 1, 1917, it was suggested that a process used in the textile industry could be used to advantage in rubber reclaiming plants. The pertinence of the suggestion is here shown in the illustration of an apparatus that has been designed for the use of rubber reclaimers.

The operation is entirely automatic and extremely simple. The iron drums are stripped from the cakes of caustic soda, which are placed on the grid in the hopper. The tank and dissolver is then filled with clear cold water so that the cakes are submerged to a depth of about 6 inches. Solution of the caustic

fabrics, and it is particularly adapted to cutting off the beads of worn-out tires.

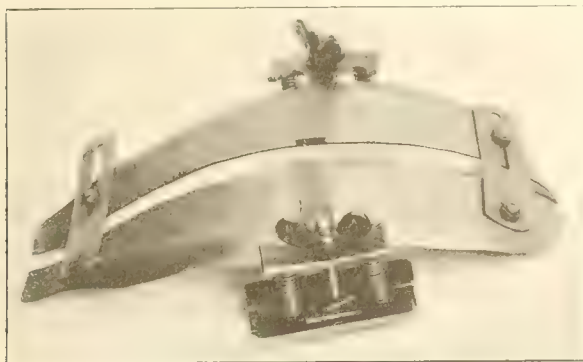
The construction is extremely simple, and its operation may be clearly understood by referring to the illustration and the following brief description:

In removing the beads from clincher tires, the casing is placed upon the horizontal guides and the vertical rollers are adjusted to the inner circumference of the tire. When the treadle is depressed the revolving cutter penetrates the wall of the casing and the pressure of the collars on the cutter arbor revolves the tire and the bead is quickly removed. The tire is then reversed and the other bead cut off in the same manner. [Reichel & Drews, Chicago, Illinois.]

THE MOMENT ADJUSTABLE COMPOSITION SOLE CRAMP.

The shortage of sole leather has greatly developed the sale of composition soles that are now being manufactured both here and abroad in large quantities. The device here shown for attaching soles to boots and shoes is a timely suggestion from England, where it is used with success.

A layer of special cement with strong adhesive properties is first applied around the edges of the sole about one inch wide and allowed to dry. It is then heated, placed on the shoe and



hammered down tightly on the last. The welt grips being opened widely, the cramp is placed on the shoe and the grips fitted over the welt or middle sole. The thumb screws are then tightened and the welt pressed down against the sole with nippers or the handle of a wedge-shaped knife, making a close joint all around, and the shoe is left in the cramp for ten minutes or until the heel is benched.

The device is adjustable to the right or left shoe by moving the sole plates up or down and better results are obtained by using a last in applying soles with this appliance. [The Revolute Co., Limited, Manchester, England.]

A NEW ALLOY FOR RUBBER MOLDS.

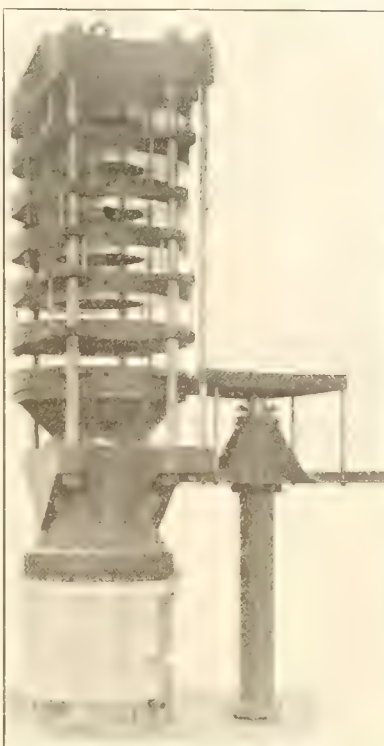
Rubber molds cast from ABCilium metal alloy are said to be so smooth that their surfaces do not require machining, polishing only being necessary, and in some cases even this may be dispensed with.

They are, moreover, impervious to all acids used in the manufacture of rubber goods and unaffected by excessive heat or soap-stone blasting.

The thermal conductivity of this metal is even greater than that of copper, consequently an instant heating or cooling is possible. A mold made of this alloy is 70 per cent lighter than an iron mold made off the same pattern, and may be constructed lighter than iron molds now in vogue. It is claimed that cast iron tire molds weighing 1,000 pounds will weigh less than 200 pounds when made of this alloy, all factors of safety being considered. The specific gravity of ABCilium is 2.51, which is lighter than 99 per cent pure aluminum. [The A. B. C. Castings Co., Cleveland, Ohio.]

SEVEN-PLATEN BEAD PRESS.

A seven-platen bead press with large capacity and novel



construction and one that has been designed to meet the requirements of modern tire production is shown in the illustration. This is a multiple opening bead press with seven round steam platens. Attached to the press is a hydraulic elevator, the platform of which is guided on two additional columns, which are part of the press.

Attached to the elevator table is a platform supported by rods. This platform is for the operator, who rises with the elevator and removes the molds from the various openings. This arrangement saves considerable floor space, as all the molds are loaded on the elevator instead of being deposited on long operating tables, as is usually done. [Southwark Foundry & Machine Co., Philadelphia, Pennsylvania.]

dry & Machine Co., Philadelphia, Pennsylvania.

THE NEW ERA BRAIDER.

The following description of a new braider should be of particular interest to manufacturers of elastic tapes and braids, as this machine is so constructed that it is almost impossible for

oil to get on the rubber or finished braids.

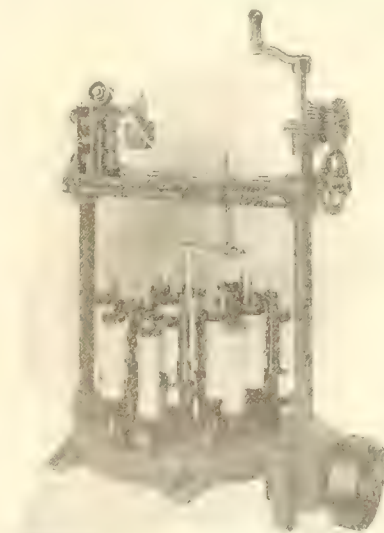
Among the advantages claimed by the manufacturers are fewer and simpler parts, increased speed, ease of operating, accessibility, safety to operator, freedom from shadows and cleanliness of work.

Perhaps the most notable change is the self-lubricating feature, the entire mechanism running in oil. It is necessary, therefore, to oil only once in several months, which makes a considerable difference in production, besides saving time. All

gears are covered, reducing liability of accident and giving a better rating by liability insurance companies. The studs are cast integral with the base, and are constructed so that they allow a positive fastening of the plates or "quoits."

All gears used in the machine are cut, and the construction is such that the carriers bear directly upon the surface, and are revolved by smooth cam action in place of being knocked around. This new action allows increased speed, with less strain and breakage of the yarn.

The carrier itself is designed to accommodate all sizes and types of bobbins, and unless otherwise ordered the machines are



equipped with carriers to take a 5-inch, 2-ounce bobbin, which reduces the changes of bobbins necessary and consequent stoppage of the machine.

It will be noted in the illustration that two small uprights take the place of the usual three uprights, which reduces the shadows cast and improves the light on the work. The starting shaft is enclosed in one of the uprights, and the finished braid passes through the other, thereby protecting it from spots and stains. The former, cross-bar and take-up are all of new design. The former consists of but one piece, giving all adjustments from one point. The cross-bar is thin, and is carried in a vertical position, throwing the least possible shadow. The take-up rolls are so situated that they provide for a longer space after the braid leaves the former in which the operator can trim up the work, pull out loose ends and attend to imperfections. Take-up gears are quickly changed by the removal of a split pin, the change taking less time than is required to describe it.

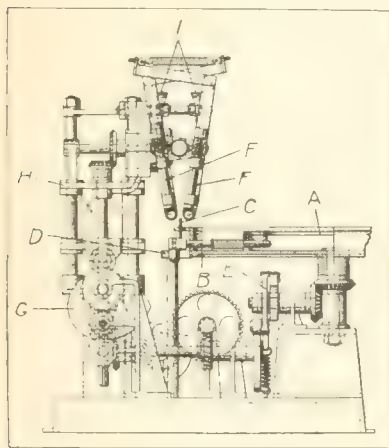
A feature of the new braider is the capacity of each machine to make three numbers of braid; for instance, a 16-spindle machine will make a 16-round braid, a 13-flat braid and a 17-flat braid. This is due to the design of the carrier race and gear layout, and the change over from one number to another is made very simply by merely changing two gears and inserting the filler bar.

This braider is particularly well adapted to make elastic braids, as its freedom from superfluous oil protects the rubber. An extra fitting is supplied to regular machines for the purpose of guiding the rubber from the tension rolls. [The Era Manufacturing Co., Providence, Rhode Island.]

MACHINERY PATENTS.

MACHINE FOR REMOVING DIPPED GOODS FROM FORMS.

THE removal of toy balloons, nipples and finger cots from the dipping forms is accomplished automatically by this machine. A side elevation, partly in section, is shown in the drawing, in



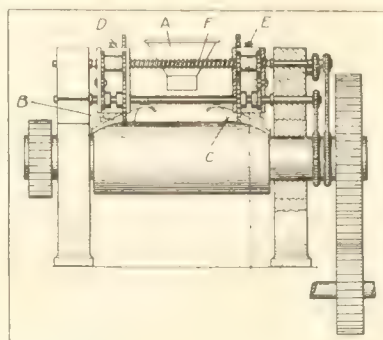
which *A* is one-half of the circular table carrying the radial spring rods *B* that support a plurality of vertical form holders *C* on their outer ends. The forms are locked against upward movement when the revolution of the table brings them in operative position by a cam plate *D*. An intermittent, or step by step, motion is given to the table by bevel gearing and a ratchet wheel operated by the bell-crank lever *E*. Thus each form

is successively brought in position to be operated upon by the stripping arms *F F*. The reciprocating motion of these arms, necessary in removing the articles from the forms, is obtained by cam *G*, that raises and lowers the carriage *H*, to which the arms are attached. The arms are opened and closed by spring-controlled cams *I*, and when the machine is in operation the forms are stripped by the revolving concave composition rollers, located at the ends of the reciprocating arms. [William A. Brubacker, assignor to the Miller Rubber Co.—both of Akron, Ohio. United States patent No. 1,220,177.]

AUTOMATIC MIXING MILL.

The manual labor of cutting and rolling back the rubber jacket that forms around the front roll of mixing and warming mills is mechanically performed by this machine. The drawings repre-

sent a front elevation, partly in section, of a two-roll mixer equipped with the automatic cutting and feeding device. This comprises a feed hopper *A*, an endless apron feed not shown,



and two cutting and turning blades *B, C* that are operated vertically by screws *D, E* and laterally by lead screw *F*, driven by chain gearing from the front roll. The intermittent action of the blades is controlled by electrically-driven clutches mounted on the vertical and horizontal screws. A rotating disk controller not shown, is

provided with contact pins that make and break the electric circuit for actuating the clutches. By arrangement of the contact pins in the disk perforations the blades are operated at proper intervals, when the rubber sleeve is cut and fed back to the rolls automatically. [Robert M. Graham, Akron, Ohio. United States patent No. 1,220,221.]

OTHER MACHINERY PATENTS.

THE UNITED STATES.

- 1,220,288. Fabric and hose making machine. L. A. Subers, East Cleveland, Ohio.
- 1,221,089. Paper carrier for wrapping machines. F. M. Pierce, assignor to Pierce Wrapping Machine Co.—both of Chicago, Ill.
- 1,221,349. Collapsible core. R. M. Merriman, Akron, Ohio.
- 1,222,259. Device for repairing pneumatic tires. G. W. Boynton, Boston, Mass.

THE DOMINION OF CANADA.

- 173,781. Tire cementing machine. J. N. Hibner, Detroit, Michigan, U. S. A.
- 173,871. Mold for hollow rubber articles. Canadian Consolidated Rubber Co., Limited, Montreal, Quebec, assignee of E. L. Stimson, Cleveland, Ohio, U. S. A.
- 174,089. Tire clasp. G. H. Broughton, Toronto, Ontario.
- 174,209. Footwear vulcanizer. Canadian Consolidated Rubber Co., Limited, Montreal, Quebec, assignee of C. J. Randall, Naugatuck, Connecticut, U. S. A.

THE UNITED KINGDOM.

- 16,328 (1915). Tire core. R. Bridge, Castleton Ironworks, Castleton, Lancashire.
- 16,330 (1915). Vulcanizer head. R. Bridge, Castleton Ironworks, Castleton, Lancashire.
- 16,400 (1915). Rubber mill. S. C. Davidson, Sirocco Engineering Works, Belfast.
- 16,549 (1915). Repair vulcanizer. A. B. Low, 108 South Broadway, and I. C. Osborn, 833 Meade street—both in Denver, Colorado.
- 16,890 (1915). A mandrel for use in joining the ends of air tubes and other rubber tubes. F. H. Hall, 6 Livery street, Birmingham.
- 17,072 (1915). Hand operated rubber grater. J. Burns, 26 Waveley Road, Coventry.
- 17,181 (1915). Tire vulcanizing mold. J. H. Coffey and J. H. Coffey, 73 Jameson avenue, Toronto, Ontario, Canada.
- 103,422. Device for preserving pressure in tennis balls. F. W. Stockton, 5450 Ridgewood Court, Chicago, Illinois, U. S. A.

PROCESS PATENTS.

RECLAIMING RUBBER FROM LEATHER TREADS.

BY this process the rubber that serves to attach leather non-skid tire treads to the casing is recovered. The metal studded leather bands are removed from the casing and a certain number of these are suspended in a steam jacketed digester, into which a mixture of 3 parts of tetrachlorure of ethane and 1 part of benzine is poured. The digester is closed and heated by introducing steam into the jacket for some minutes. Tetrachlorure of ethane has the property of dissolving a considerable quantity of sulphur when warm. The liquid containing the dissolved sulphur is drawn off into a suitable apparatus, where it is recovered for further use.

The same quantity of solvent is poured into the digester and

heated for half an hour at a temperature not exceeding 120 degrees C. By the action of the solvent the rubber is separated from the leather and sinks to the bottom of the digester in the form of a pasty mass on which a jet of steam is directed, causing evaporation of the solvent. This evaporated liquid is condensed and collected to serve anew. The mass of rubber is removed through the manhole in the lower part of the digester, washed and rolled into sheets. [L. B. Becker. French patent No. 481,851.]

WASHING AND SHEETING DIFFERENT QUALITIES OF CRUDE RUBBER. Plantation rubber and fine Para or wild rubber are mixed together, passed through the washing machine in the usual way and sheeted, water being allowed to flow over the rubber during its passage between the rolls. [Erwin E. A. G. Meyer, assignor to Morgan & Wright—both of Detroit, Michigan. United States patent No. 1,218,949.]

OTHER PROCESS PATENTS.

THE UNITED STATES.

1,219,833. Method of building cord tires. R. M. Merriman, Akron, Ohio.

THE DOMINION OF CANADA.

174,203. Method of making footwear. Improvement in the art of manufacturing rubber shoes. Canadian Consolidated Rubber Co., Limited, Montreal, Quebec, assignee of W. E. Piper, Melrose, Massachusetts, U. S. A.

THE UNITED KINGDOM.

16,226 (1915). Preparation of rubber for vulcanization. W. J. Mellersh-Jackson, 28 Southampton Buildings, London. [Boston Rubber Shoe Co., Malden, Massachusetts.]

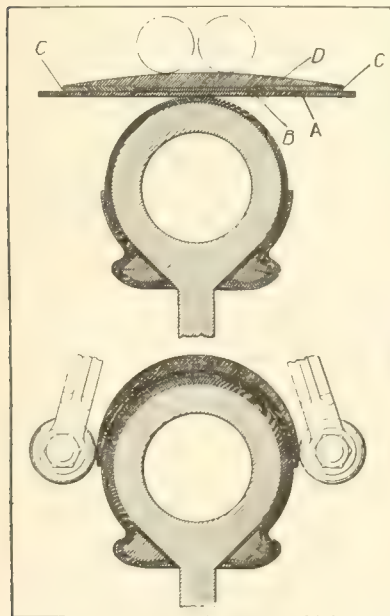
COLOMBIA.

1,279. Process for waterproofing cloths and skins for rubber ponchos, coats, leggings, shoes, etc. Ramon A. Vélez, Urrao, Antioquia, Republic of Colombia, South America.

MISCELLANEOUS PATENTS.

APPLYING TREAD COVERS TO TIRE CARCASSES.

IN this invention the outer layers forming the tread and side portions of the tire casing are assembled one upon the other, forming a slab that is applied to the casing by a special rolling device.

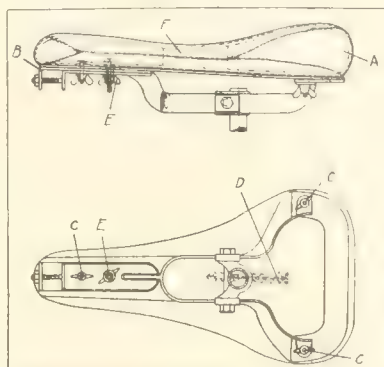


The carcass is built up with successive fabric plies and the beads applied in the usual manner with the exception, however, of the tread and fabric strips forming the outer covering. These parts are mounted one upon the other as they come from the calender, in the following order. First comes the cushion strip A, that covers the tread portion and extends part way down the sides of the carcass; then the breaker strip B and the filler strips C that abut against the edges of the breaker strip, and finally the tread strip D. A pair

of rolling devices, comprising two spherical bodies mounted in ball bearings at the ends of two co-acting arms, exert a circumferential as well as radial action in rolling the slab on the carcass. [Ferdinand F. Brucker, assignor to The Miller Rubber Co.—both of Akron, Ohio. United States patent No. 1,220,178.]

FRENCH PNEUMATIC CUSHION SADDLE FOR BICYCLES AND MOTORCYCLES.

The saddle is composed of a leather-covered cushion, in which is enclosed one or more rubber air chambers of suitable form and provided with air valves. The envelope A is attached to the



metal support B by screws C. A stout leather plate, strengthened with a sheet of ebonite, fiber or other stiff material, is inserted between the envelope and the metal support, to prevent their contact.

The air chambers are introduced into the envelope through a slit D and inflated through valve E.

When only one air chamber is used, the concave form shown in the illustration may be obtained by a compartment F, or by small stays placed between the upper and lower walls of the air chamber. [Mariani and Radaelli. French patent No. 481,673 (May 6, 1916.)]

NARROW ELASTIC WEBBING. The essential feature of this invention consists in sewing one or more rows of longitudinal stitches through the web, after it has been woven with uniform tension on the loom. [Archibald Turner, Leicester, England. United States patent No. 1,221,489.]

MOTOR AND ACCESSORY MANUFACTURERS.

At a meeting of the executive committee, board of directors and credit committee of the Motor and Accessory Manufacturers last month, a committee consisting of C. W. Stiger, Christian Girl and W. O. Rutherford was appointed to mobilize the resources, both materials and men, of the association for the purpose of cooperating with the National Government in its needs, mainly in supplying component parts of motor cars and trucks, airplanes, motor boats and tractors.

The idea of grouping the members according to the products they manufacture, having received an approving vote from 95 per cent of all the members, a committee was appointed to present a plan for such purpose, consisting of C. W. Stiger, W. O. Rutherford and L. M. Bradley.

A midseason meeting, an innovation for this association, will be held at Atlantic City, September 12, 13 and 14. Committees were appointed to perfect plans for this meeting.

PROVIDING FOR WAR DEPENDENTS.

The desirability of some uniform method of providing for the dependent families of men enlisting in the military and naval forces has resulted in considerable agitation of the matter. Some firms are paying full wages in addition to the army compensation, others are paying the difference between the army wage and that previously received by the employee, while many desire to do the proper thing but have not decided what that really is.

Secretary of War Baker has asked the Chamber of Commerce of the United States to ascertain the sentiment of the business men of the country regarding voluntary assistance, and a special committee has been appointed to take care of the matter, of which F. A. Seiberling, president of the Goodyear Tire & Rubber Co., is chairman.

The National Fire Protection Association will hold its annual meeting in Washington, May 8, 9 and 10. A large attendance is expected. Over 100 new associate members were added in March, and the list was largely added to last month.

New Goods and Specialties.

BATHING CAP NOVELTIES

THE season for the beach parade is drawing near and this year's coterie of feminine bathers bids fair to outrival last summer's in piquancy of headgear. As beautiful colors may now be obtained in rubber as in any other material, and its pliancy and velvety texture are highly attractive. A few of the novelties of this season in bathing caps which are likely to be popular are here shown. In the top illustration the body of the cap is gathered at the sides and caught by two rosettes, a band and streamers of a contrasting color in rubber hanging loose except when the wearer goes in the water, when the streamers may be securely tied about



the head, thus adequately protecting the hair. A jockey cap of mottled rubber with a striped visor is a really appealing innovation, and



the lower illustration displays a square-cornered cap with a tight-fitting band and trimmings of striped rubber in contrasting shades. [United States Rubber Co., 1790 Broadway, New York City.]

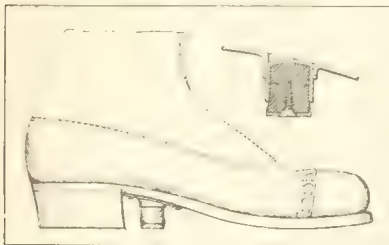


ROLLER SKATE WITH RUBBER CUSHIONS.

A sidewalk roller skate, claimed to possess all the advantages of the higher priced rink skate, has two large rubber bumpers or cushions which give great resiliency, relieve the jar from the wearer when roller-skating on hard pavements or sidewalks, and materially assist in permitting a free turning axle. This skate has self-contained ball bearing wheels, two sets of bearings to each wheel, and is strongly constructed yet lighter in weight than the average roller skate. It is adjustable and will fit shoes from 8½ to 11 inches in length. [Conron-McNeal Co., Kokomo, Indiana.]

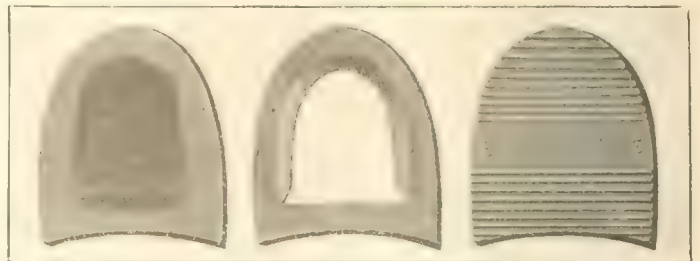
RUBBER CUSHION HEEL AS AN ARCH SUPPORT

This arch-supporter, in the form of an extra heel, is claimed to combine the advantages of those that are built in the shoe and those that are detachable, since it cannot move about under the arch of the foot, yet can be adjusted to meet the individual requirements of the wearer. A solid cushion of rubber is permanently fastened in a steel sleeve, threaded at one end so that it may be screwed to the metal base-plate that is placed in front of the ordinary heel. A metal plate underneath the rubber cushion adds to its wearing qualities, and when the proper height of supporter is selected this resilient supplemental heel should add considerably to the wearer's comfort in standing or walking. [Peter Broadbrooks, Batavia, New York.]



THE KANGAROO REVERSIBLE HEEL.

The novelty in this heel consists in the means and method of attaching the rubber part to the leather or composition leather lift that is nailed to the shoe in the ordinary manner. No cement is necessary, thus greatly reducing the time required for attaching the heel to the shoe. The heel comprises two parts that are dovetailed together. The leather or composition part that is nailed to the heel of the shoe is provided with a central opening and beveled edges. The rubber heel, or tread, is also molded with a projecting portion, the edges of which dovetail into those of the leather lift, holding both parts firmly together. After the leather portion is nailed to the shoe the rubber heel may be easily slipped in place by hand, no further fastening being required. When worn



out a new pair may be readily applied by the wearer. Should the heels wear unevenly they can be quickly exchanged. They are also non-slipping and have no nail holes to become clogged with dirt. [David William Jameson, Newark, New Jersey.]

SHAMPOO CHAIR AND BASIN WITH RUBBER PAD.

Having the hair shampooed is generally regarded by women as an uncomfortable necessity, the neck being held in a strained position long enough to cause considerable discomfort. Various methods of alleviating the inconvenience of this operation have been devised and a recently invented chair and basin arrangement appears to offer an agreeable solution of the difficulty. This new chair to be placed about six inches in front of the basin, has a hinged back which is lowered until the head rests comfortably on a rubber neck-piece forming part of the basin. With the head in position the hair can be washed thoroughly, soap lotion being applied through a small faucet and hose at the left. A gas heater in a water compartment makes it possible to obtain hot water instantly at any desired temperature. [The Excelsior Shampoo Outfit Co., Chicago, Illinois.]



RUBBER FABRIC WATER BAGS FOR THE ARMY.

During the recent Mexican campaign a new application of rubber in army equipment was developed which may prove advantageous again. It consisted in the use of rubber fabric bags

for carrying and purifying drinking water for the troops. These bags, which were designed by the quartermaster's department, are of double texture material, the outside of heavy khaki duck, similar to army cloth, and the lining of a thinner material. This is made up into cylindrical bags about the size of a barrel and of a capacity of about 50 gallons. There is a metal hoop at the top hinged to close like a traveling bag, and, at the bottom, four taps where the contents can be drawn off into canteens. These bags are filled with water from any available source, and by means of chemicals are purified and rendered fit for drinking within a few minutes, and this water is transported in these heavy bags with other stores of supplies needed by the army.

"CORALINE" ERASERS.

A new series of rubber erasers of an attractive coral hue, doubtless suggesting the above trade name, has recently been put upon the market. These erasers appeal especially to draftsmen, since their rhomboid shape makes erasure easy without disturbing the adjacent lines or letters. The texture is soft and velvety and they are claimed to possess excellent erasive qualities. They are supplied in two sizes, No. 310, small and No. 315, large. [Weldon Roberts Rubber Co., Newark, New Jersey.]



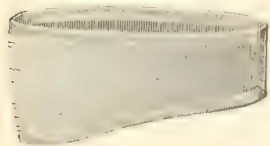
RUBBER HEEL WITH REPLACEABLE PLUGS.

A rubber heel employing an entirely new principle as well as a new design, is here shown. Replaceable plugs of white rubber are fitted at three points into the ordinary cushion heel, as seen in the illustration, and these plugs keep the heel absolutely level, doing away with the tendency of the usual rubber heel to wear down at the edges. The plugs also prevent slipping, and although they never pull out unless intentionally removed, their movement, in and out, as the wearer walks, gives added resilience. When worn down they are easily replaced, without the use of cement, by moistening the base with vaseline or any heavy lubricant and pressing straight down into the heel with any blunt instrument. [Emery Heel Sales Co., Boston, Massachusetts.]

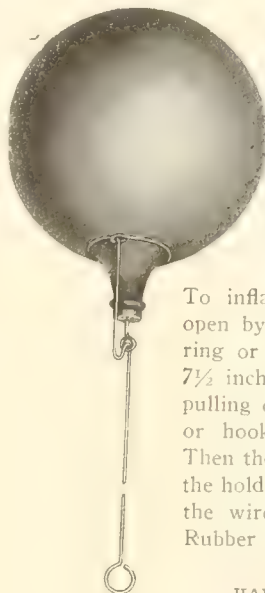


ELASTIC AUTO-BODY SUPPORTER.

Long rides in automobiles, while beneficial to the health in many ways, are apt to have an injurious effect if the body is not well supported, owing to the continuous jarring of the machine. Women's corsets afford such support, and for men a practical appliance is now on the market which adequately sustains the back and abdomen against this jarring motion, yet affords the absolute freedom required. This "Auto-Body Supporter" is in the form of a well-shaped elastic band of pink silk-finish thread interwoven with rubber thread. It is made 6 inches deep, in all sizes. [Sharp & Smith, Chicago, Illinois.]



TOY BALLOON WITH WIRE HOLDER AND HOOKED-DOWN VALVE.



An attractive novelty is shown in the "Perfection" toy balloon. It remains invariably upright, waving gracefully on the end of a wire holder, and is held in perfect alinement with the wire by being firmly hooked down to the valve. The advantage of this holder over the old reed and string variety is self-evident. Also, it is a simple matter to inflate or deflate the balloon by means of the valve.

To inflate, ascertain that the valve is open by pushing in gently on the wire ring or hook; these balloons inflate to 7½ inches in diameter. After inflating, pulling outward gently on the wire ring or hook will tightly close the valve. Then the hook is put through the ring in the holder and hooked into the U bend in the wire under the ring. [The Globe Rubber Co., Cuyahoga Falls, Ohio.]

HARD RUBBER PENCIL HOLDER.

A pencil holder that is practical and convenient for short lengths of pencils is made entirely of hard rubber. The holder consists of a barrel four inches long for regular pocket size, or three inches long for vest pocket and shopping bag size. A tapered, reversible pencil clutch is fitted to one end of the holder and this holds securely either hexagon or round-shaped pencils of varying diameter. A removable eraser clutch inserted in the opposite end of the holder takes a standard size erasive tip which is easily renewable. These holders are supplied completely equipped with pencil and eraser and in various styles, with fancy mountings, if desired. [Vaughn-Upton Co., Inc., 249-251 Causeway street, Boston, Massachusetts.]



THE WEILAPHONE.

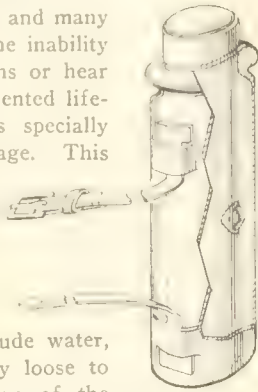
A telephone booth shuts out all disturbing sounds but cannot increase the power of the voice coming from the receiver. Both these desirable objects are accomplished, it is claimed, by a simple attachment called the "Weilaphone," shown in the accompanying illustration, in which the base, ear tips and Y-shaped holders are made of hard rubber composition, connected by soft rubber tubing. The contour of the ear pieces in relation to the face is formed and maintained by a copper wire proceeding from the Y piece upward, extending



ing a short distance in the ear pieces. By means of this wire the instrument is held in place in the ears, rendering unnecessary the use of the hands to support it. When the instrument is in use, the telephone receiver is set on a soft rubber cap on the base piece that not only supports the receiver but serves to modify the harsh sounds sometimes incidental to the use of the telephone receiver and to shut out all outside noises and vibrations, thus bringing the voice at the other end of the wire clearly and distinctly to the user of the "Weilaphone." [The Weilaphone, Inc., New York City.]

LIFE PRESERVER FLASHLIGHT ATTACHMENT.

The difficulty of rescuing people from the water at night or in a fog is readily apparent, and many lives have been lost at sea owing to the inability of would-be rescuers to see the victims or hear their cries for assistance. A newly invented life-saving apparatus, shown herewith, is specially designed to overcome this disadvantage. This device consists of a rubber bag in which is contained an electric flashlight, the whole being attached by straps or other suitable fastening means to the ordinary form of life-preserver or life-belt. The rubber fits tightly around the lens, so as to exclude water, but the body of the bag is sufficiently loose to permit operation of the contact button of the flashlight. [A. M. McGiff, 337 West Twentieth street, New York City.]



NON-SKID RUBBER HEEL AND FIBER-SOLE.

A rubber heel embodying the same non-skid angle design as the well-known tire tread of its manufacturer has recently been placed upon the market. This heel is tough wearing and springy, and the angle tread, shown in the accompanying illustration, affords a firm foothold.



Coincident with the manufacture of this heel, the company began making a fiber sole which is claimed to be an exceptionally high-grade product that can be stitched, trimmed and finished the same as leather. The same material is also made in sheets of any desired thickness for soling. Both heels and soles are supplied in black, tan or white. [The Marathon Tire & Rubber Co., Cuyahoga Falls, Ohio.]

IMPROVED FIRE HOSE CABINET.

An interesting invention for fire equipment comprises a metal hose cabinet 18 inches high, 13 inches wide and 4 inches deep, inside measurements, so constructed that as soon as the hose is drawn out of the cabinet, water begins to flow through it. Fifty feet of $\frac{3}{4}$ -inch fire hose, provided with a nozzle and so arranged that it takes up but 8 inches of the cabinet's entire width, is held in place by two steel coil springs which are covered with rubber, thus preventing all damage to the hose should it be replaced after use before it is thoroughly dry. One end of the hose is connected to an automatic, double-seated valve, locked when not in use, and seated against the pressure. When in use, this valve is seated with the pressure and the more pressure is applied the tighter it becomes.



This cabinet can be placed in any house or public building and is supplied by a water pipe connected with the house supply, affording the same facilities as a fire department. [John Egleston, Westfield, Massachusetts.]

The National Insulate Co., Inc., with offices at 1239 Broadway, New York City, is now equipped to manufacture articles made of composition materials, such as phonograph records, molded electrical parts, buttons and novelties.

EXPLOSION OF A HORIZONTAL VULCANIZER.

SEVERAL months ago a horizontal vulcanizer used for open steam curing in an English rubber mill exploded violently, blowing off the head, but, fortunately, no one was injured. The investigation that followed revealed the following facts which proved beyond all doubt that with ordinary care the accident would not have happened.

The vulcanizer was of the ordinary horizontal type, with a $\frac{3}{8}$ -inch iron shell, 4 feet 6 inches in diameter by 6 feet long. The back end iron plate was $\frac{5}{8}$ inch in thickness, flanged and single riveted to the shell with rivets $2\frac{1}{8}$ inches apart. The door was the full diameter of the pan and of $\frac{5}{8}$ -inch iron plate, dished



VULCANIZER DOOR BLOWN OFF BY EXPLOSION.

about 6 inches. It was hinged to the shell and held in place by 21 hinged bolts, $1\frac{1}{4}$ inches in diameter, fitting into slots in the angle bar and door. Steam was supplied through a reducing valve set to 45 pounds, and the usual fittings were provided, including a relief valve set to 45 pounds.

The cause of the explosion was the forcing out of the 12 lower bolts from their slots, due to the door flange being angled or sprung, the door being then forced away from the remaining 9 bolts.

The explosion was of a violent nature, the door being blown bodily off, breaking the hinge at the pan, and tearing the door flange in way of the hinge, as shown in the illustration. The reaction lifted the pan bodily and forced it back, breaking the front standard, the pan finally being held up by two of the lower bolts resting on the top of the front standard. Practically all the contents of the pan were discharged and the pan itself suffered no damage except the broken hinge.

BRITSON COMPANY TO BUILD IN OMAHA.

The Britson Manufacturing Co., Brookings, South Dakota, has decided to locate in Omaha, Nebraska, although the date when building operations on its new plant will be begun has not yet been decided upon. This company manufactures a metal-studded tire with a 10,000 mile guarantee. The Omaha factory will be equipped for the manufacture of a complete line of rubber tires, in both plain tread and non-skid types, also inner tubes, and later on the company contemplates adding to its present line other rubber articles which can be manufactured to advantage. The directors are as follows: A. O. Britson, president and general manager; George W. Cobel, H. F. Haroldson, G. J. Flittie and W. L. Montgomery.

The Editor's Book Table.

A GERMAN-ENGLISH DICTIONARY FOR CHEMISTS. BY AUSTIN M. Patterson, Ph.D. John Wiley & Sons, Inc., New York City. [5 by 7 inches, 332 pages, flexible binding. Price, \$2, net.]

THE need of a book of this kind has been keenly felt by all scientific men, whether well versed in the German language or otherwise. Germany is headquarters for technical, scientific work, and German scientific publications contain a great amount of valuable matter, some of which is difficult to understand and which the average German-English dictionary translates very inadequately. Dr. Patterson was formerly editor of "Chemical Abstracts," as well as editor of chemical terms for Webster's New International Dictionary, and thus is peculiarly fitted for preparing a work of this kind. While special attention is given to this particular need, a fairly voluminous general vocabulary is also included, in which, however, occur many words having a technical as well as a popular meaning, and this meaning is given first, although in ordinary dictionaries it may be omitted or at least not given the prominence it deserves. The book is small enough to go in the pocket, is well bound in flexible covers, and cannot fail to be of everyday use to those who read the German scientific papers, and especially the chemical ones, to keep abreast of the times.

UNIFIED ACCOUNTING METHODS FOR INDUSTRIALS. BY Clinton E. Woods. The Ronald Press Co., New York City. [Large 8vo, 466 pages, half leather. Price \$5, postpaid.]

Industrial accounting is as diversified as are industrial concerns. The need of a unified system is acknowledged by accountants themselves. Many institutions have adopted and adapted, have added to their systems item by item, until the result is complexity rather than simplicity and clarity. The author, who has been connected with prominent concerns, among them at least one large rubber company, has for 20 years been handling industrial problems of large and small industries, and this book, which is in the form of a detailed accounting system, is intended to fit into every element of an industrial or manufacturing business, of whatever size or nature. It is written for the executive, the engineer and the accountant, and presents a system which would seem exceedingly efficient. Supplementing the body of the work are nearly 100 forms for statements, cards, charts, labor accounts, analysis, sheets, inventory, etc.

THE DANISH WEST INDIES, THEIR RESOURCES AND COMMERCIAL IMPORTANCE. By H. G. Brock, Philip S. Smith and W. A. Tucker. Department of Commerce, Washington, D. C. [68 pages, illustrated. Price, 15 cents.]

Now that the Danish West Indies are no longer Danish, but are possessions of the United States, this description of them is one which will interest all classes of readers. The book gives a large amount of information condensed into a comparatively small space and treats of the geographical characteristics, government resources, business conditions, agricultural and allied industries. Several interesting illustrations, a map showing the position of these islands, and enlarged maps of the four principal ones are included.

In the chapter devoted to agriculture and allied industries no mention is made of the cultivation of rubber, but it is interesting to note that cotton is second only to sugar as a product of these islands. In 1913 some 2,000 acres were devoted to Sea Island cotton, but owing to the appearance of insect pests in the fields, and to the various difficulties experienced as a result of the European war, financial loss was threatened, and since that year cotton raising has been temporarily abandoned. Several varieties of cotton were considered by the agricultural experiment station, including "Sterling S," "Cameron 106," "Sakellarides" and "Southern Cross," and from these, many crosses and hybrids

have been evolved with the object of securing a variety which will resist the ravages of insects and which will produce a good quantity and quality of lint. It is claimed that the yield from a 4½-acre plat where careful records were kept was 5,299 pounds of seed cotton yielding 25 per cent lint, worth in Manchester, England, 34 cents a pound. This shows that cotton is a profitable crop when cultivated in commercial acreages. It is estimated that there are about 5,000 acres on the south side of the island of St. Croix that might be profitably cultivated.

COMMERCIAL TRAVELERS IN LATIN AMERICA. BY L. DOMERATZKY. Government Printing Office, Washington, D. C. [42 pages. Price, 10 cents.]

This pamphlet, which is No. 35 of the Tariff Series, published by the Bureau of Foreign and Domestic Commerce, Department of Commerce, is certainly a valuable compilation of facts which are absolutely necessary to be known by all business houses that contemplate extending their trade to Latin America by personal representatives. It gives the regulations in each country which apply to the commercial traveler—the documents he should take with him; the customs treatment of his samples; the duties on advertising matter and such miscellaneous information as passports, buying seasons, expenses, and the like. Each country is treated separately. All countries in Central and South America are included, as well as Cuba, Haiti and the Dominican Republic.

STANDARD METHODS OF CHEMICAL ANALYSIS. EDITED BY Wilfred W. Scott. D. Van Nostrand Co., New York City. [6 by 9 inches, 894 pages, illustrated, cloth. Price, postpaid, \$6.]

This is a compilation of carefully selected methods of technical analysis that have proven of practical value to the professional chemist. Mr. Scott, who is research chemist of the General Chemical Co. and was formerly chief chemist of the Baldwin Locomotive Works, is the author of many chapters and has been assisted in the preparation of the book by a large number of eminent chemists, each somewhat of a specialist in his own particular line of analysis. Each chapter is devoted to one element, and is arranged according to the physical properties, detection, estimation, preparation and solution of the samples, separations and methods. The chapter on "Sulphur" contains 28 pages and 6 illustrations. Among articles of interest is one on the determination of antimony in rubber goods. The book is one which may well find a place in the library of the analytical chemist, where it is likely to be of frequent use.

PURCHASING. ITS ECONOMIC ASPECTS AND PROPER METHODS. By H. B. Twyford. D. Van Nostrand Co., New York City. [6 by 9 inches, 252 pages, 112 charts, diagrams and forms. Price, \$3, net.]

Equal to if not greater than any other department of modern industry is that of the purchasing agent. All other branches of a mercantile or manufacturing plant may be efficient but if the goods and materials are not of the right kind and quality or not bought at right prices, that establishment cannot succeed. The author of this work has a wide experience in manufacturing, engineering and electrical railway industries, and the book shows most effectively the results of this experience. The work is divided into several sections, starting with purchasing in its widest phase, the art and ethics of buying being considered. The personnel of the purchasing department is explained, showing the organization and the duties of each of the workers in that department. Following this is a description of the operation of the purchasing department, the method of handling invoices, the operation of stores, all of these being fully described and forms shown for use in each division of the department. Diagrams through the book show the progress of an order from the time the requirement is reported to the purchasing agent, until the purchase is completed. These diagrams run from a simple

routine in the small business to the complex and more highly perfected systems of great industries. Many points brought out in each chapter are of sufficient value to render the book highly useful to the man who buys, whether he be in a large organization or simply running a small business.

CHEMICAL ENGINEERING CATALOG THE CHEMICAL CATALOG
C. E. JONES, Manager, New York City, N. Y. 10011, Index, 288
pages, 1916.

This book is in the nature of a compilation of catalogs of concerns which supply chemical engineering equipment, machinery, chemicals and supplies. It is intended to supersede a large mass of printed matter issued by individual manufacturers and is classified and indexed so that it furnishes in a small compass a large amount of information of value to chemical engineers, chemists and manufacturers in any way connected with chemical industries. The classified index is confined to 75 or 80 pages, the rest of the book being in the nature of condensed catalogs of a large number of concerns identified with the trade. This catalog is not sold but is loaned to those interested in the chemical and allied industries and is approved by a committee representing the American Institute of Chemical Engineers, the American Chemical Society and the New York Section of the Society of Chemical Industry.

ANNUAL REPORT OF THE INDUSTRIAL COMMISSION OF NEW
YORK STATE, Department of Labor, 1915-16, 417 pages.

Every large employer of labor in New York State will find much of interest in the annual report of the Industrial Commission published by the Department of Labor. Its ten parts are devoted to the general report of the Commission and the more detailed reports of the several bureaus, including that of Inspection, Workmen's Compensation, Mediation and Arbitration, Statistics and Information, Employment, Industries and Immigration, Industrial Code and Fire Hazards, Boilers and Explosives. Many opinions of the attorney-general construing the labor laws constitute the final part.

New York is among the 24 states which, like most European countries, maintain public employment offices. The records of this bureau for the year ending September 30, 1915, show 22,856 persons applied for by employers, 49,554 situations wanted, 26,641 persons referred, and 13,391 positions reported filled. There are 26 occupational groups under males and 8 under females. Factory workers, both male and female, include rubber and allied products workers, while male general laborers include rubber and allied products laborers.

COMPTES RENDUS DE L'AMANHIA, A COMMUNICATION ADDRESSED TO THE "Société Nationale d'Agriculture" during the session of November 14, 1916, by J. A. Vazquez de Almeida. Published by "Jornal do Brasil," Rio de Janeiro, Brazil.

In this communication the author strongly urges the encouragement of earnest and scientific cultivation of the *Hevea* in Acre, and to this end requests the above society to aid by spreading the necessary information and by interesting the right kind of men to undertake such planting. He points out that superior qualities of the true *Hevea Brasiliensis*, found in Acre and vicinity, deteriorate more or less when it is transplanted to other localities. In connection with this species especially he calls attention to the unscrupulous methods of tapping by which these trees, in a very short time, are either killed or rendered unproductive. He pleads for such supervision and regulation as will suppress this evil and gives warning that such practices, due to greed or general ignorance, are factors which make it possible for the Orient to compete successfully with Brazil.

A report of the author's plantation in Rio Yaco by the agricultural authorities of Alto Purus, and an estimate of the gains to be derived from a plantation similar to that of Dr. Alencar are final arguments for planting rubber in this natural habitat of the *Hevea*.

NEW TRADE PUBLICATIONS.

THE tire repair man can get many valuable ideas and suggestions from the 1917 catalog of the Williams Foundry & Machine Co., Akron, Ohio, which has just been issued. It not only describes and pictures the full line of tire making and tire repairing machines, tools and appliances manufactured by this house, but also contains a great amount of information of practical value to those engaged in this line of business.

* * *

The B. F. Goodrich Co., Akron, Ohio, has issued an attractive 40-page pamphlet describing its rubber goods for the lumber industry, which is carefully compiled, handsomely printed and profusely illustrated. It is not a mere catalog, but to a certain extent a handbook of interesting information on this subject.

* * *

Health insurance is one of the proposed factors of modern efficiency. Facts in respect to compulsory health insurance, as presented at legislative hearings in New York and Massachusetts, are succinctly given in a pamphlet sent by Magnus W. Alexander, Lynn, Massachusetts.

* * *

Werner & Pfleiderer Co., Saginaw, Michigan, manufacturer of mixing and kneading machinery, is sending out one of the handsomest and best arranged catalogs of this class of goods which we have seen. The book contains 84 pages, each printed in two colors, the cover, in full colors and handsomely embossed, appropriately showing a brawny workman holding one of the peculiar shaped mixing blades from the company's machines. Each digester, dissolver, washer, kneader or mixer is shown in half-tone from carefully retouched photographs. Much information regarding dimensions, capacity and special adaptation is given, also guarantees and conditions under which these machines are sold, and other matter of interest to rubber cement and rubber goods manufacturers.

* * *

A neat desk or wall calendar has been received from the Xylos Rubber Co., Limited, reclaimer, Manchester, England. In an appropriate setting are cards for days, months and dates, prominent and distinct, while the background contains advertising information of the concern's specialties.

* * *

The United States Rubber Co., New York City, has adopted the name "Keds" for its lines of canvas shoes with rubber soles, and is sending out some excellent window display matter for advertising these goods. A cut-out of paper represents a young man and a young woman, each wearing these shoes, between and beyond them a view of a tennis court; these to be placed across the front of the window. The cut-outs are so gummed that by moistening they can be made to adhere to the window. There are attractive and odd-shaped window cards for display with shoes of this character and a diagram explains the proper arrangement of all these in the window. The advertising matter is in brilliant natural colors, and the whole display is likely to be of advertising value to the storekeepers who may utilize it.

* * *

"Mobilizing Money for War" is the title of a 12-page pamphlet being distributed by the Guaranty Trust Co. of New York, intended to show the reason for and the necessity of investing in the great government loan for national defense to which the public will soon be given an opportunity to subscribe. It points out that the United States is the richest country in the world to-day, its national assets equaling the combined wealth of Great Britain, Russia, France and Italy, and that the whole nation must enlist its wealth as well as its manhood to win the war.

Interesting Letters from Our Readers.

OUR GROWING RUBBER TRADE WITH THE DUTCH EAST INDIES.

TO THE EDITOR OF THE INDIA RUBBER WORLD:

DEAR SIR—According to the present trend of the trade the Dutch East Indies promise to become a greater source of rubber for American manufacturers than ever before. The demand for smoked sheet from Java and Sumatra plantations, always good, has increased considerably of late because of obstacles placed in the way of American buyers in the British colonies. The increasing war export duty, which has no counterpart in the Dutch colonies, is perhaps the principal reason, although the permit, which must be procured of the Tire and Rubber Committee in London, is an important factor because it delays and renders shipments so uncertain. It is to be hoped that with the United States in arms shoulder to shoulder with England, the American rubber trade may be relieved of some, at least, of the many formalities which have attended all rubber imports during the war.

England cannot well afford to lose her largest rubber customer, which consumed about 80,000 tons of plantation rubber in 1916, for which an average price of 70 cents a pound or \$1,568 a ton was paid. The year's total business, therefore, aggregated \$125,440,000, and as the profits averaged 45 cents a pound, Malayan planters are \$80,640,000 the richer thereby. The Dutch rubber production is increasing steadily, however, and the acreage and bearing figures of the Growers' Association of Batavia indicate that it will reach 120,000 tons annually in 1919, which is 5,000 tons more than the total consumption of the United States in 1916. A more considerate arrangement with America is the only thing that will prevent a still further transfer of trade to the Dutch colonies. This is shown conclusively by the fact that although prices have risen several cents above those in Malaya for similar grades, American buying still continues good.

OBSERVER.

Boston, April 23, 1917.

A PACIFIC MERCHANT FLEET.

TO THE EDITOR OF THE INDIA RUBBER WORLD:

DEAR SIR—Every American of spirit welcomes the plan to build 3,000 wooden cargo ships of 3,000 tons each, 1,000 of them to be in service within 18 months. It does the heart good to see activities about the old New England shipyards again, and to know that many others are to be opened elsewhere. By such means the "Stars and Stripes" will once more become a familiar flag in the principal ports of the world, and this is quite as it should be. These wooden makeshifts can later be replaced by steel ships and, as THE INDIA RUBBER WORLD has repeatedly asserted, the commerce of our great nation must never again be allowed to depend upon foreign bottoms.

A ship flying the American flag every three miles, and later every mile, between America and England or France is indeed a prophecy to stir the imagination, but are we not forgetting the Pacific in our efforts virtually to bridge the Atlantic? Our duty to provision, munition and otherwise supply neutrals and the nations engaged in our common cause is plain, but to do so entails the importation of great quantities of raw material, much of which comes or might come to our Pacific coast.

No thinking person doubts but that ruthless submarine warfare will presently be extended to our Atlantic coast, so that unavoidable ship losses in the export of manufactures will make it essential to conserve tonnage in imports to the very maximum. The increasing dependence of the United States upon the tropics for raw materials and foodstuffs not produced in this country is

shown by the enormous imports of tropical products during the fiscal year 1916, amounting to \$1,060,850,416, of which \$304,000,000 was rubber. Much of this vast total comes from the East or foreign Pacific ports, and during the war can be brought to San Francisco or Seattle more safely than to Atlantic coast cities. Moreover, high cargo and insurance rates and the losses by submarine attack, certain to come, will render transcontinental freights relatively less formidable.

During 1916 about 80,000 tons of rubber, or 27 cargoes of 3,000 tons each, came from the East and had it become necessary might have been entered at Pacific coast ports. Our exports to Middle and Far East countries are constantly increasing, and Russian events promise to render Vladivostock one of our great foreign markets, so that there will be cargoes to go both ways. American consumers to-day are dependent upon British and Japanese ships to bring rubber from Singapore, Colombo and Penang, via Hong Kong, where it is transferred at a considerable loss of time and labor. Submarine losses have reduced the British service, and although a new service has been inaugurated by two Dutch ships between Batavia and America, the situation is not greatly relieved. Because of the lack of ships the cargo rate to America from Hong Kong had early this year been increased from \$24 to \$30 a ton.

Let a goodly number of our proposed fleet of wooden merchantmen be built in Pacific coast yards and put into service to the Far East, that the American flag may become as familiar there as in the days when ships from New England seaport towns were known the world around.

A RUBBER IMPORTER.

San Francisco, April 16, 1917.

JUDICIAL DECISIONS.

CONSOLIDATED RUBBER TIRE CO. vs. THE B. F. GOODRICH CO.; CONSOLIDATED RUBBER TIRE CO. vs. REPUBLIC RUBBER CO. These were suits in equity on exceptions to the report of the master, brought before the District Court, N. D. Illinois, E. D. It was held that the master's recommendation of five cents a pound as a reasonable royalty should be approved; furthermore, according to precedent, the law read that a licensee of part of the patent rights in a certain territory, or even in the whole country, cannot sue in his own name. The decision was that the reports of the master in each case should be approved, and all objections and exceptions thereto overruled. [Federal Reporter, Vol. 237, page 893.]

UNITED STATES CUSTOMS DECISIONS.

The United States Court of Customs Appeals, March 26, 1917, rendered the following decision relating to raincoats in the case of True Fit Waterproof Co. v. United States. Goods made by cementing with rubber a cotton cloth to a cotton and wool cloth, and goods made by cementing with rubber a cotton and silk cloth to a cotton and wool cloth, the rubber in each case being negligible in value, are composed in chief value of cotton, wool, or silk, according to which represents the greatest value as yarn, plus its proportion, on the basis of quantity, of the cost of weaving and other expenses incurred in making the cloth and bringing it to the condition it had immediately prior to its combination with the other materials in order to form the goods in question. For this purpose that cloth which is composed in chief value of one of these fibers should not be regarded as made entirely of it. Raincoats made from such goods are dutiable under paragraphs 256, 266, or 291, given below, according to the material of chief

value as found by this rule, and not as wearing apparel not specially provided for (par. 261).

Paragraph 256. Clothing, ready-made, and articles of wearing apparel of every description, composed of cotton or other vegetable fiber, or of which cotton or other vegetable fiber is the component material of chief value, or of cotton or other vegetable fiber and india rubber, made up or manufactured, wholly or in part, * * * and not otherwise specially provided for in this section, 30 per centum ad valorem; * * *.

Paragraph 266. All articles made from cotton cloth, whether finished or unfinished, and all manufactures of cotton or of which cotton is the component material of chief value, not specially provided for in this section, 30 per centum ad valorem.

Paragraph 291. Clothing, ready-made, and articles of wearing apparel of every description * * * made up or manufactured wholly or in part, and not specially provided for in this section, composed wholly or in chief value of wool, 35 per centum ad valorem.

* * *

Rubber-faced card cloth, reported by the appraiser to be in chief value of cotton and classified at 30 per cent ad valorem, was protested by Ashworth Bros., Boston, Massachusetts. It was found that rubber is the component material of chief value in the card cloth here in question and therefore dutiable as manufactures of rubber at 10 per cent. [No. 40,712. Before Board 2, March 23, 1917.]

* * *

SHELDON & Co. v. THE UNITED STATES. The chicle latex having been drawn from the tree and coagulated by artificial heat into hard chunks in Mexico, shipped to Canada and there ground and dried, the grinding and drying bearing no relation to transportation and being a process in the manufacture of chewing gum known commercially as desiccated chicle, is dutiable at 20 cents per pound. [United States Court of Customs Appeals, April 2, 1917.]

TRADE-MARK DECISIONS.

PRESIDENT SUSPENDER CO. v. MACWILLIAM. The facts in the "President" suspender case are as follows: The defendant registered a trade-mark for suspenders and shortly thereafter patented certain features of the particular article to which this mark was applied. After the grant of the patent the plaintiff was given an exclusive license to manufacture and sell the suspenders during the life of the patent. Upon the expiration of the patent the defendant commenced to use the mark and the plaintiff brought suit in the district court. The decision was in favor of the plaintiff and the defendant appealed to the circuit court which affirmed the decision of the lower court.

From this decision it follows that a patentee who gives an exclusive license to another to manufacture and sell a patented article for the life of the patent, and who at the same time transfers the good-will of the business to the licensee, does not retain any trade-mark rights of which he can avail himself either during the life of the patent or on its expiration. [U. S. Trade-Mark Bulletin, March, 1917.]

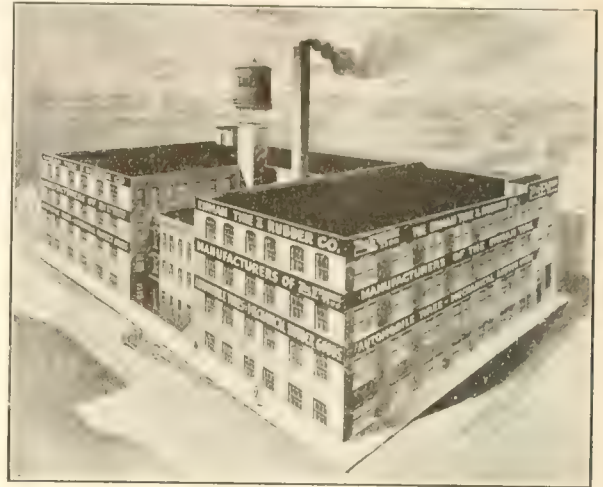
* * *

THE MILLER RUBBER CO. v. BEHREND & ROTHSCHILD. A manufacturer of toy balloons, who owned a design patent on a toy balloon made in imitation of a watermelon, has failed in an attempt to restrain a manufacturer from marketing a similar balloon. The court held that the design patent was void, and that no one was entitled to the monopoly of a toy balloon made in imitation of a watermelon. [U. S. Trade-Mark Bulletin, March, 1917.]

A Canadian manufacturer of rubber heels having reduced the terms of discounts, the Toronto Shoe Repairers' Association is asking for a reconsideration and requests 15 per cent discount on all orders of a half gross or more.

THE EHMAN RUBBER CO.

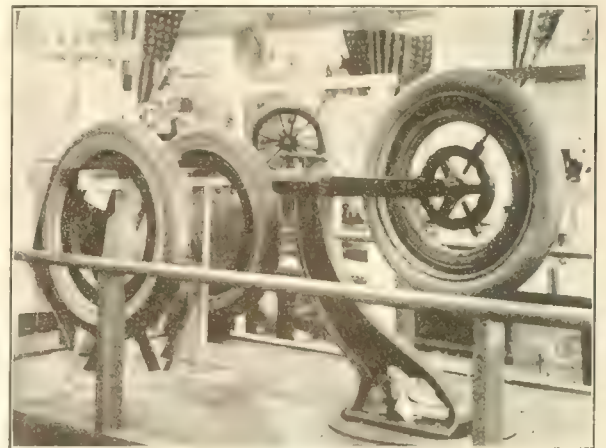
AMONG the progressive rubber manufacturing plants of the middle west is the Ehman Rubber Co., of Twenty-seventh and La Salle Streets, Chicago, Illinois. This company, which is being operated along up-to-date lines, is turning out tires and



PLANT OF THE EHMAN TIRE & RUBBER CO.

mechanical goods of standard quality. The plant, under its present management, has been appreciably extended and plans have already been made for large additions. The new equipment includes up-to-date machinery and devices which contribute so largely to the successful operation of the factory.

A. E. Ehman, president and general manager, has demonstrated by the prompt introduction of available men and methods



EHMAN EXHIBIT AT THE ROTHSCHILD ACCESSORY SHOW.

that he is an efficiency man in the best acceptance of the term.

The Ehman tire, it is claimed, has already achieved an excellent reputation and is being extensively popularized through an aggressive campaign now in operation by its makers.

At the Rothschild Accessory Show held in Chicago, the Ehman exhibit attracted many visitors. The actual operations necessary in the construction of a pneumatic tire were here shown by an experienced demonstrator, who built up a complete tire on the core, ready for vulcanization.

"Rubber Machinery," Mr. Pearson's newest book, filled with valuable information for rubber manufacturers, is now ready for mailing. Price, \$6.

The Obituary Record.

MANY YEARS IN RECLAIMING BUSINESS.

EDWARD MORTIMER MUNDY, treasurer of the Philadelphia Rubber Works Co., died on March 6 of pneumonia, at the advanced age of 81 years.

Mr. Mundy became associated with the late Colonel Nathaniel Chapman Mitchell, founder of the Philadelphia Rubber Works Co., in 1881, and for 30 years held the office of treasurer of the company.

The following resolution was adopted at the last board meeting of the company:

Resolved: That in the death of our treasurer, Mr. Edward Mortimer Mundy, this company has lost a highly valued and faithful officer of unswerving integrity, whose fine qualities of loyalty and kindness greatly endeared him to all those who had the privilege of being associated with him. The board of directors extend to Mrs. Mundy and to his family the most profound expression of sympathy.

Mr. Mundy was interred at Greenwood Cemetery, Brooklyn, New York. He is survived by his widow and a daughter, Mrs. William G. Davies.

AN EXPERT IN TIRE MANUFACTURE.

James E. Tourtellotte, who died in Philadelphia, Pennsylvania, March 5, was for 21 years connected with the rubber tire business. For 15 years he was superintendent of the Hartford Rubber Works Co., Hartford, Connecticut, and later became general factory manager. At the time of his death he was connected with the Ajax Rubber Co., Inc., at Trenton, New Jersey. He was born at Thompson, Connecticut, September 5, 1857, and was a graduate of the Worcester Polytechnic Institute, Worcester, Massachusetts. A widow and one son survive him.

MANY YEARS WITH ONE COMPANY.

William Volz, assistant secretary of the Eureka Fire Hose Manufacturing Co., New York City, died on April 2, after a brief illness. He entered the employ of the company as office boy 22 years ago, and steadily advanced in usefulness and efficiency, finally reaching the position he held at the time of his death. He is survived by a widow, two children and his mother.

A PIONEER TIRE MAN.

Alexander O. Holroyd, formerly manager of the Prince George Hotel, Daytona, Florida, died in that city the middle of last month. Mr. Holroyd came to this country from England, being identified with the American Dunlop Tire Co. from its beginning, later joining the forces of the Hartford Rubber Works Co., in charge of the automobile tire department, and in 1907 going to Columbus, Ohio, as vice-president of the Midgley Manufacturing Co. In 1909 he left the latter concern to enter the hotel business.

He was a man of pleasing personality and left many friends in the automobile business, and was also popular with tourists wintering in Florida.

FORMERLY A RUBBER SALESMAN.

Elias E. Cox, a veteran of the Civil War, and for more than thirty years identified with the manufacturing rubber industry, died at his home in East Providence, Rhode Island, March 24. He was in his 72nd year and was born at Mount Tabor, Vermont. During the Civil War he served four years in the Seventh Vermont Regiment. He was associated with several rubber concerns in Connecticut and Massachusetts and finally entered the sales department of the National India Rubber Co. at Bristol, about 45 years ago. At the time of the Exposition at Philadel-

phia, in 1876, Mr. Cox was in charge of the National Rubber Co.'s working exhibit. In recent years Mr. Cox had carried on a laundry business in Providence, but his health had been very poor since last September. He leaves a widow, a son and a daughter.

WELL KNOWN IN THE WEST.

Leland E. English, for 16 years special representative of the Voorhees Rubber Manufacturing Co., of Jersey City, New Jersey, died suddenly of apoplexy at Joplin, Missouri, on April 2.



L. E. ENGLISH.

Mr. English was born at Sacramento, California, October 17, 1860. He began his career in the trade with the western branch of the Revere Rubber Co., Chelsea, Massachusetts, first as traveling salesman, and then, successively assistant manager and manager of the Chicago branch establishment of that company. He joined the force of Voorhees Rubber Manufacturing Co. 16 years ago, becoming its special representative in the West. He made his

headquarters in Joplin, Missouri, but he was one of the best-known men in the trade in every city of the West and Middle West. He was a man of striking appearance, had a broad technical knowledge of the trade, was an indomitable worker, and his wonderful capacity of remembering names and faces was combined with a happy faculty of making friends wherever he traveled. He leaves one son, Drummond English, of Chicago, Illinois.

AN OLD AND VALUED EMPLOYEE.

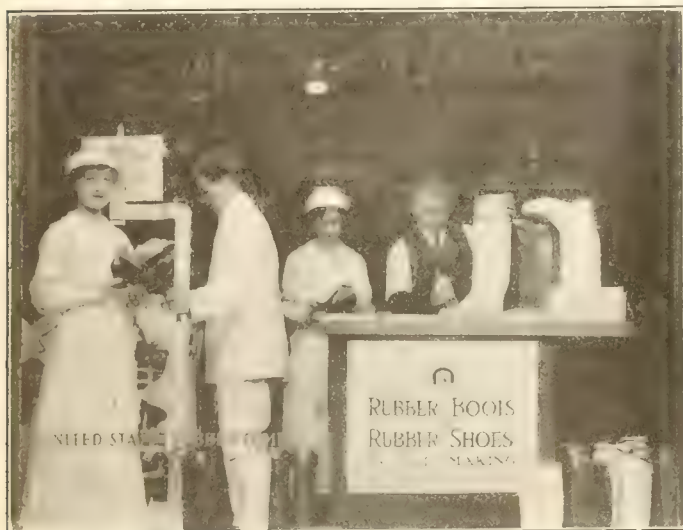
Samuel Gould, for many years in the employ of the American Hard Rubber Co., at its Butler, New Jersey, plant, died at his home in that town recently, aged 63 years.

OZOKERITE IN UTAH.

Ozokerite, which is largely used in insulating compounds and in the manufacture of hard rubber articles, until the present European war, came mainly from Galicia, Austria. Some domestic ozokerite was found in Utah, but not until recently has the American product assumed importance. A deposit in Wasatch County, Utah, which approximates two miles wide and 12 miles long, has been developed within the last year or so. The refining plant at Soldier Summit has a capacity of treating 10 tons of raw material per day, yielding 400 pounds of ozokerite. Changes are contemplated in the process of extraction which it is estimated will enable the plant to handle 1,000 tons of crude material, and proportionately enlarge the output. It is expected that this industry will result in preventing the profitable importation of the Galician product should an attempt be made to do so after the war is over.

RUBBER MANUFACTURING PROCESSES IN SHOW WINDOWS.

MANY enterprising merchants have found that the most effective show window advertising has been that which has some "live" element in it, and wax models have given way in many cases to real people, whose actions or labors in the windows have resulted in attracting more closely the attention of the passersby. Rubber manufacturers have not been backward in this respect. Last month in *THE INDIA RUBBER WORLD* mention was made of the manufacture of rubber footwear in



MAKING FOOTWEAR IN A SHOW WINDOW

the window of the United States Rubber Co. in its Broadway building in New York City, where two men and two women employees were busily engaged in putting together rubber boots and shoes. There was also shown a machine employed to sub-



CORD-LAYING MACHINES IN A SHOW WINDOW

mit the women's rubbers to heavy atmospheric pressure, thus exploiting the pressure process goods manufactured by that company. On the week of March 19 this company had another exhibit of like character—two young women busily engaged in making bathing caps, while a frame-like orifice at the rear disclosed a third young woman arrayed in bathing cap and costume, whose principal vocation seemed to be to try on one bathing cap after another. Behind her was a back-

ground of a seashore scene. These exhibits were viewed by thousands who stopped for a longer or shorter time in order to see and study the processes, or, perhaps, admire the bather.

Another live exhibit by a rubber company was shown in the Boston, Massachusetts, store of The B. F. Goodrich Co., where two patented cord-laying machines were shown in operation under the supervision of experts sent from the Akron, Ohio, factory. These machines, which seemed almost human in their manipulation in laying the cord for the "Silvertown" tires, created much interest during the entire term of their exhibit and must have been of real practical value in familiarizing automobilists with the construction of these tires. This exhibit is being shown in the various cities where the Goodrich company has large retail stores.

It might be well in this connection to mention the patriotic display shown in the window of the United States Rubber Co.'s store in New York City last month. The window was lined with velvet, and the background was a large United States flag above which were several smaller draped flags interspersed with laurel branches, which were also liberally used as embellishments in other parts of the window. In the center of the window on a marble column was a handsome specimen of the American eagle, mounted on a branch, with wings and beak extended, a fine sample of the taxidermist's art. In front of this was a marble bust of Washington and in the immediate foreground a card



BATHING CAPS IN THE MAKING AND WEARING

reading, "For particulars as to location of army and navy recruiting stations in New York and vicinity please apply in store." At the sides of the window were grouped flags of many friendly nations, among them those of Great Britain, France, Russia, Italy, Belgium, Portugal, Serbia, Roumania, Panama, Cuba and Japan. These flags were grouped around standards which were trimmed with a broad blue ribbon, over which was a narrower white ribbon, thus forming the ribbon trade-mark which has been adopted by the company in its advertising. Not only was the window an artistic and attractive one, but it served its mission by calling attention to the need of recruiting at the time.

THERE IS A PROPOSITION BEFORE THE MILWAUKEE CITY COUNCIL TO pass an ordinance, having for its object the elimination of unnecessary noise. Among the provisions are that no whistles shall be blown to start or end the day's work, or at noon or other time, except fire boats, fire engines or steamboats seeking to pass through a drawbridge. Persons making deliveries of any kind between 11 p. m. and 7 a. m. shall wear rubber heels, and milkmen must pad their trays to eliminate noise.

News of the American Rubber Trade.

BESAW TO BUILD IN ARDMORE, OKLAHOMA.

THE BeSaw Tire & Rubber Co., Hartville, Ohio, is obliged greatly to enlarge its capacity and will shortly build a plant in Ardmore, Oklahoma, this site being selected as offering ample housing for employes, natural resources such as oil and gas fuel, and territory now requiring a large consumption of automobile tires. The new factory will have a capacity of at least 500 tires a day and to finance the project properly the capital stock will be increased from \$220,000 to \$1,000,000. Charles A. BeSaw is president of the company and P. P. Parker, general sales manager.

EXPANSION OF THE FISK RUBBER CO.

This illustration of The Fisk Rubber Co.'s plant at Chicopee Falls, Massachusetts, shows the new mill building which will afford greatly increased tire production, the floor space now devoted to tire manufacture totaling over 29 acres. The new addition is one of the largest single mill buildings in New England, having six floors measuring 600 feet long by 105 feet wide. It is now fully equipped with the most approved machinery, operated by unit electric power plants.



PLANT OF THE FISK RUBBER CO., CHICOPEE FALLS, MASSACHUSETTS.

APSLEY RUBBER CO.

The financial statement of the Apsley Rubber Co., Hudson, Massachusetts, as of January 31, compares with the previous year as follows:

ASSETS		1917	1916
Cash, notes and account receivable		\$609,927	\$461,560
Inventory		612,061	627,035
Stock investments			57,680
Real estate, machinery, etc.		623,296	580,103
Patent rights and trade-marks		300,000	300,000
Total		\$2,145,284	\$2,026,378
LIABILITIES:			
Common stock		\$500,000	\$500,000
Preferred stock		643,300	615,600
Notes payable		380,000	399,573
Accounts payable		218,608	174,199
Surplus		403,376	337,006
Total		\$2,145,284	\$2,026,378

RUBBER COMPANY SHARE QUOTATIONS.

The following market quotations of shares of rubber manufacturing companies on April 25 are furnished by John Burnham & Co., 115 Broadway, New York City, and 41 South La Salle street, Chicago, Illinois:

	Bid.	Asked.
Ajax Rubber Co. (new)	67½	70
Firestone Tire & Rubber Co., common	121	135
Firestone Tire & Rubber Co., preferred	106½	108
The B. F. Goodrich Co., common	50½	51
The B. F. Goodrich Co., preferred	108½	109
Goodyear Tire & Rubber Co., common	208	213
Goodyear Tire & Rubber Co., preferred	106½	108½
Kelly-Springfield Tire Co., common	51½	52
Kelly-Springfield Tire Co., preferred	85	94
Miller Rubber Co., common	200	210
Miller Rubber Co., preferred	104½	106
Portage Rubber Co.	141	147
Swinehart Tire & Rubber Co.	70	78
United States Rubber Co., common	58½	59
United States Rubber Co., preferred	106¾	107¾

UNITED STATES RUBBER CO. PENSION PLAN.

The United States Rubber Co. has announced a comprehensive pension plan for its employes, whereby every man and woman who has been continuously in the employ of the company for 20 or more years, either with the parent company or any of its subsidiary companies, and has reached a certain age (namely, men 65 and women 60 years), may be retired on a pension, the amount of which will depend upon the wages or salary received and the number of years the employe has served the company. Retirement from service on pension is optional with the employe under certain conditions, and under other conditions lies in the discretion of the Pension Committee. The smallest amount payable will be \$20 per month. Under certain conditions men may be pensioned at the age of 60 and women at 55.

It is expected that the appropriation for the first year will benefit many of the older employes, while the great army of men and women younger in point of service will have the assurance of protection when their efficiency becomes impaired through advanced age. The company will assume such expenditures as may be necessary in

administering the plan and no contributions will be required from any employes.

Employes absent on military service for the country will not have such absence deducted from the computation of their years of service, nor constitute a break in the continuity of employment for purposes of the pension benefits. Service for the country will thus be counted equivalent to service for the company.

RUBBER COMPANY DIVIDENDS.

The American Tire Fabric Co. paid a quarterly dividend of 1¾ per cent on first preferred stock on April 2 to stockholders of record March 20.

The United States Rubber Co. has declared a regular quarterly dividend of 2 per cent on first preferred stock, payable April 30 to stockholders of record April 16.

The Westinghouse Electric & Manufacturing Co. paid a quarterly dividend of 1¾ per cent on preferred stock on April 16. Also, a dividend of ¾ per cent on common stock has been declared, payable April 30 to stockholders of record April 5.

The Kelly-Springfield Tire Co. has declared the regular quarterly dividend of \$1 a share on common stock, payable May 1 to stockholders of record April 16.

The Hood Rubber Co. has declared a quarterly dividend of 1¾ per cent on preferred stock, payable May 1 to stockholders of record April 26.

The Marathon Tire & Rubber Co. has increased its dividend payable May 1 from the rate of 6 to 7 per cent per annum.

At a meeting held on April 25, directors of The B. F. Goodrich Co. declared a regular quarterly dividend of \$1 per share on common stock, payable August 15 to stockholders of record August 3.

TRADE NOTES.

At the annual meeting of The Gutta Percha & Rubber Manufacturing Co., New York City, held on April 4, the old officers were reelected as follows: Henry Spadone, president; Walter W. Spadone, vice-president; Alfred A. Spadone, secretary; George B. Dickerson, treasurer.

The Raw Products Co., New York City, will move on May 1 to 78-80 Wall street, the new quarters comprising a suite of four rooms on the ninth floor.

The general offices of the Republic Rubber Co. of New York, including the mechanical sales department, railroad sales, export sales, and accounting departments, are now located on the fourth floor of the Singer Building, 149 Broadway, New York City, the pneumatic tire sales department and storage rooms remaining at 229 West Fifty-eighth street.

I. J. Cohen & Co., wholesale dealer in rubber, scrap iron and metals, Kansas City, Missouri, has recently moved into a new building at 1,406 West Ninth street.

Work has begun on a new office building for the Republic Rubber Co., Youngstown, Ohio, which will be a duplicate of the present office building, with a connecting link comprising the new entrance, elevator and stairway. The construction will be of reinforced concrete, designed to carry another story when further expansion becomes necessary. It is planned to have this new structure the center unit of a series of three buildings, all to be used for general offices, accounting, etc., including a well-equipped hospital.

The selling corporation, Muller & Phipps (Asia), Limited, whose headquarters are at Englewood, New Jersey, with branch offices in a large number of Asiatic cities, has incorporated its Singapore branch as Muller, Phipps & Sellers, Limited. H. A. Sellers, who was for several years associated with United Engineers, Limited, is managing director.

Byron C. Dowse, former president of the Federal Rubber Manufacturing Co., Milwaukee, and Cudahy, Wisconsin, and formerly one of the chief owners of the G. & J. Tire Co., Indianapolis, Indiana, has formed a new tire manufacturing concern under the name of the Dowse Rubber Co., a certificate of whose incorporation was filed at the office of Secretary of State at Dover, Delaware, with an authorized capital stock of \$2,500,000. The general offices and one factory will be in Chicago, Illinois, with another factory in prospect.

The Eagle-Picher Lead Co. announces the removal of its offices to the Architect's Building, 101 Park avenue, New York City.

The Turner, Vaughn & Taylor Co., Cuyahoga Falls, Ohio, is extending its factory to meet the requirements of a remarkably increased trade in the rubber business, and when the additions to the machine and foundry departments are completed this summer the company will have practically a new foundry, with the floor space about doubled. A new office building is also being erected.

After May 1 the offices of Yglesias & Co., Inc., will be located at 29 Broadway, New York City.

The Red Cross Rubber Co., to be located at Norwalk, Ohio, is the name of a new rubber manufacturing concern which proposes to make rubber novelties. The men interested are Claude Martin and G. M. Switzer, both of Ashland, Ohio.

The Standard Asphalt & Rubber Co., Lawrenceville, Illinois, and the Petroleum Products Co., Independence, Kansas, have recently merged, and the combination will be known as the Sarco Petroleum Products Co. There will be no change in the management or interests identified with the new name.

The Electric Hose & Rubber Co., Wilmington, Delaware, has taken out a \$300,000 blanket policy covering the lives of its several hundred employees.

JOHN W. MAGUIRE.

BRIEF mention was made last month of the appointment of John W. Maguire as general sales manager of tires and mechanical rubber goods of the Brunswick-Balke-Collender Co.,



J. W. MAGUIRE.

of Chicago, Illinois and Muskegon, Michigan. Mr. Maguire is well known in the rubber business, having been associated with it since 1894, when he entered the business as salesman for the Trenton Rubber Co. Six years later he became sales manager for the Lake Shore Rubber Co., Erie, Pennsylvania. In 1906 he associated himself with The Republic Rubber Co., Youngstown, Ohio, as general salesman, and since 1911 has been sales manager of the Chicago branch

establishment of that company, resigning recently to assume his new position.

Mr. Maguire is a "live wire," as is shown in his work for the rehabilitation of the Chicago Automobile Club, of which he was recently elected vice-president. He is also a director in the Chicago Automobile Trade Association, and is president of the Gym Knights, an active organization in the gymnasium life of the Chicago Athletic Association.

It will thus be seen that Mr. Maguire brings to the Brunswick-Balke-Collender Co. not only a ripe experience peculiarly fitting him for his new position, but a wide acquaintance and popularity which must conduce to still greater distribution of the lines for which he assumes the sales management.

PERSONAL MENTION.

Harry E. Dennie, formerly connected with the Salt Lake City branch of the Imperial Belting Co., of Chicago, Illinois, has been appointed Western manager, with headquarters at 525 Market street, San Francisco, California.

Alfred Smith, Manchester, England, dealer in rubber chemicals and compounding ingredients, has opened offices at 98 Maiden Lane, New York City, under the management of E. H. Watson.

Herman Gossen, formerly affiliated with the Bothamley Chemical & Extract Co. and the Casella Color Co., is now associated with J. Early Wood, Inc., New York City, having been appointed manager of the Philadelphia, Pennsylvania, office of that well-known chemical house.

Ralph M. Loewenthal, for the past six years sales manager for The Loewenthal Co., at the Brooklyn, New York, office, has recently resigned. Mr. Loewenthal's future plans are as yet unformed, but he will undoubtedly continue in some branch of the rubber industry. His activities when with The Loewenthal Co. included charge of warehousing operations, facilities, system, and supervision of special gradings, manipulations, etc.

A. F. Peterson has been appointed manager of the San Francisco, California, branch of The Fisk Rubber Co., of Chicopee Falls, Massachusetts, succeeding M. H. Whipple.

PROCEEDINGS OF THE RUBBER ASSOCIATION.

THE following cable correspondence between British rubber associations and The Rubber Association of America, Inc., will be read with interest:

London, April 17, 1917.
The committee of the Rubber Trade Association of London, on behalf of all members, extend to you, your executive and members, cordial and sincere greetings on the active participation of the United States in the defense of the free peoples.
WILLIAM HENDREY, Chairman.

New York, April 23, 1917.
William Hendrey, Chairman, Rubber Trade Association of London, London, England.

Officers, directors and members of Rubber Association of America unite in reciprocating your greetings. The United States stands ready to make every sacrifice, and we welcome and are proud of the opportunity to fight for our common ideals of humanity and civilization.

FIRESTONE, President, Rubber Association of America.

London, April 20, 1917.
Firestone, President, Rubber Association America, New York City:
Council of Rubber Growers' Association tenders, on America Day, fraternal greetings Rubber Association of America on entry of United States into struggle for preservation of civilization.

ROSING, Chairman.

New York, April 23, 1917.
Rosling, Chairman, Rubber Growers' Association, London, England:
Officers, directors and members of Rubber Association of America united in reciprocating your fraternal greetings. England and America have common ideals, and the United States stands ready to make every sacrifice for the preservation of our civilization.

FIRESTONE, President, Rubber Association of America.

NEW MEMBERS.—At the Executive Committee meeting held April 5, one associate and eight firm members were elected.

FIRM MEMBERS.

Corona Rubber Reclaiming Co., Germantown, Pennsylvania. Representative, R. B. Caverly.

Stockton Rubber Co., Stockton, New Jersey. Representative, D. G. Price or E. K. Price.

Gillette Safety Tire Co., Eau Claire, Wisconsin, Representative, S. P. Woodard.

The Barrett Co., New York City. Representative, F. J. Barber.

Industrial Chemical Co., New York City. Representative, J. Wrench.

Gaston, Williams & Wigmore, New York City. Representative, D. Gonzales.

Hawkeye Tire & Rubber Co., Des Moines, Iowa. Representative, John T. Christie.

Alexander & Baldwin, Inc., New York City. Representative, C. A. Dann.

ASSOCIATE MEMBER.

Kelly-Springfield Tire Co., New York City. Representative Frederick A. Seaman or Otis R. Cook.

LEGISLATIVE COMMITTEE.—George B. Hodgman, Hodgman Rubber Co., Tuckahoe, New York, volunteered to act as the third member of the Legislative Committee. This committee, the other members of which are Frederic C. Hood, chairman, and H. Stuart Hotchkiss, is actively opposing the proposed tax on crude rubber. As a result of its efforts there is every reason to believe that the war revenue bill will not include crude rubber in the list of materials proposed for taxation.

RUBBER RECLAIMERS DIVISION.—At the meeting held April 11, the circular, "Standards of Scrap Rubber Specifications and Packing" was approved and will be presented for adoption at a conference of the Classification and Conference Committee of the Scrap Rubber Division of the National Association of Waste Material Dealers, and the Reclaimers' Division of the Rubber Association, to be held on May 2.

RUBBER SUNDRIES DIVISION.—The Rubber Sundries Manufacturers' Division met March 30 and voted to establish an "Open Price Exchange Bureau" for the purpose of distributing price information to the members. It is reported that the Bureau will be in operation May 1. A meeting will be held May 4, and in the future such meetings will be held on the first Friday of each month.

EXPORTERS DIVISION.—This division will meet May 4, when the Committee on By-Laws and the Committee on Nominations will present their respective reports.

PROPOSED PROOFERS DIVISION.—A meeting was held on March 26 and preliminary action taken to effect a permanent organization at the meeting held on April 25.

SPECIAL MEETING.—A special meeting of the firm members was held April 26 and changes in the certain amendments to the constitution and by-laws were made to facilitate the work of the Committee on Arbitration.

NATIONAL DEFENSE.—At a joint meeting of the Executive Committee and Rubber Advisory Committee, April 5, a committee consisting of H. Stuart Hotchkiss, Arthur H. Marks and Frederic C. Hood was appointed to represent The Rubber Association of America, Inc., and to offer to the United States Government, through the Advisory Commission of the Council of National Defense, the services of The Rubber Association of America, Inc.

TRADE NOTES.

The Towar Cotton Mills, Inc., Niles, Michigan, is contemplating the enlargement of its mill for the purpose of manufacturing tire fabrics. The mill is now running to capacity on heavy duck, and the company is considering the installation of 40 automatic wide looms, designed especially for weaving tire duck. Scott Towar, of Chicago, Illinois, is president.

The Ellert Rubber Co., F. I. Ellert proprietor and manager, is now located at 1307 Sutter street, San Francisco, California, where a complete stock of automobile tires, tubes and accessories is carried.

The Saginaw Tire Co., Saginaw, Michigan, is equipped for retreading old tires and also carries new tires and tubes. F. C. Loudon is general manager.

The Para Auto Tire Co., Chicago, Illinois, distributor for the Vacuum Cup automobile tires of the Pennsylvania Rubber Co., has been awarded a contract by the City of Chicago, Department of Police, for their entire requirements in pneumatic tires for the year 1917; also for the Frank Parmelee Co., and, in addition, the Para company is furnishing these tires as regular equipment to the Marshall Field Co., Mandel Brothers, and other large corporations and commercial houses in that city.

The capital stock of the Dunlop Tire Sales Co., Inc., New York City, has been increased to \$250,000.

The C. A. Shaler Co., Waupun, Wisconsin, maker of vulcanizing apparatus, tire tools and accessories, will add two stories, 50 by 50 feet, to its present one-story nickel-plating shop.

The Turner Tire Co., St. Louis, Missouri, incorporated with a capital stock of \$13,000 by F. E. Turner, Muskogee, Oklahoma; Charles Neimeyer, Little Rock, Arkansas, and N. W. McLeod, H. V. Stevens and S. T. G. Smith, to manufacture vehicle tires, has been dissolved.

The property of the Alliance Rubber Co., Alliance, Ohio, was sold at public auction by H. C. Koehler, receiver, on April 14. The purchaser was the Sioux City Tire & Rubber Co., and the price paid was \$45,000, a figure in excess of the appraised value. The Sioux City company expects to remove the machinery and equipment to its new plant in Sioux City, Missouri. The real estate will be sold.

Fire recently damaged the plant and stock of the McFall Rubber Co., Kansas City, Missouri, to the extent of \$40,000, about \$35,000 worth of tires and accessories being consumed.

The Colorado Tire & Leather Co., Denver, Colorado, is completing two additional units to its plant, with complete calender, mill and tire equipment. This company is now manufacturing a full line of tires and various rubber accessories for the automobile trade, including fan belts, emergency boots, cement, repair materials, etc., and the new units will enlarge the capacity of the plant approximately 50 per cent.

The Sterns Tire & Tube Co., St. Louis, Missouri, has taken over the \$1,000,000 company of the Efficiency Oil Corp., the name of the latter concern being changed to Sterns Tire & Tube Co. on December 6, 1916.

A. D. Phillips, formerly general eastern agent of the Western Maryland Railway, is now traffic manager of The Fisk Rubber Co., Chicopee Falls, Massachusetts, with entire charge of the company's shipping and rating.

E. C. Merkel, formerly branch manager for the Knight Tire & Rubber Co., in Chicago, Illinois, recently resigned to take charge of sales for the Chicago branch of the Federal Rubber Co.

TALMON HENRY RIEDER.

TALMON HENRY RIEDER, who was recently elected president of the Canadian Consolidated Rubber Co., Limited, Montreal, Canada, has had a somewhat phenomenal career. Com-



T. H. RIEDER.

paratively few men less than 40 years of age have risen to such high and important position, and fewer still can point to a more steady and rapid advancement, once their proper vocation is found. Born in the little town of New Hamburg, Ontario, Canada, after graduation from the high school at Berlin (now Kitchener), Ontario, he entered the general store of his father at the age of 14 as clerk. Five or six years afterward he became stenogra-

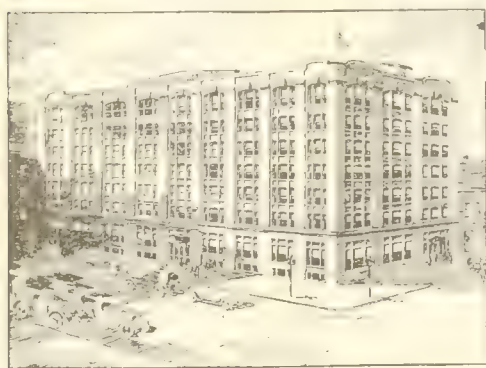
pher and also meter reader for the Berlin Gas Company.

In 1900 he entered the rubber business as bookkeeper and director of the Berlin Rubber Manufacturing Co., Limited. Three years later he organized the Merchants Rubber Co., Limited, built the plant at Berlin and became managing director. Ten years ago the Berlin and the Merchants companies were absorbed by the Canadian Consolidated Rubber Co., Limited, at which time he was made vice-president and manager of the two companies at Berlin. In 1908 he was elected vice-president of the Canadian Consolidated Rubber Co., Limited, and in 1915 was made general manager, still retaining the vice-presidency. Last month he was elected president.

From a minor position in a small rubber company, to the head of one of the six greatest industries in Canada in the short space of 17 years is an achievement of which he may well be proud. To have done this is an earnest proof of his indomitable energy, his untiring zeal and his executive ability.

W. D. ALLEN MANUFACTURING CO. MOVES.

The new building into which the W. D. Allen Manufacturing Co., Chicago, Illinois, will move about May 1 is shown herewith.

W. D. ALLEN MANUFACTURING Co.'s
NEW BUILDING.

located at Lake and Jefferson streets and has seven stories and basement, with a 61-foot frontage.

The business of this concern in mechanical rubber and brass goods has for some time been beyond the capacity of its former quarters at 133-135 West Lake street, necessitating the rental of warehouse space in three different locations. The new plant is

CANADIAN CONSOLIDATED ANNUAL REPORT.

The Canadian Consolidated Rubber Co., Limited, of Montreal, Canada, according to its annual report for the calendar year 1916, did the largest volume of business in its history. The condensed statement of the Consolidated and constituent companies gives the following figures:

ASSETS.	
Property and plants.....	\$6,256,951.87
Inventories, manufactured goods and materials.....	\$5,372,588.25
Cash.....	87,043.19
Accounts and bills receivable.....	2,319,130.43
Investments, including good will.....	4,511,094.79
Miscellaneous.....	447,097.71
	<u>12,738,954.37</u>
LIABILITIES.	
Preferred capital stock.....	\$3,600,000.00
Common capital stock.....	2,805,500.00
	<u>\$5,805,500.00</u>
6 per cent bonds due October 1, 1946.....	2,596,500.00
5 per cent debentures due December 1, 1918.....	2,500,000.00
Bills payable.....	2,771,244.73
Accounts payable and sundry accruals.....	1,168,536.57
Reserve for bad debts, depreciation, etc.....	846,224.89
Surplus.....	3,307,900.05
	<u>\$18,995,906.24</u>
INCOME.	
Net sales, footwear, tires, mechanical and miscellaneous.....	\$12,094,695.51
Cost of goods sold, selling and general expenses, taxes, interest on borrowed money, repairs, depreciations, provisions for bad debts and tire replacements net.....	<u>11,189,490.42</u>
Net profit from operations.....	905,205.09
War tax on profits.....	<u>77,624.80</u>
Net profits remaining with company.....	827,580.29
Dividends paid on preferred stock.....	<u>209,979.00</u>
Net addition to surplus.....	617,601.29
Surplus January 1.....	<u>2,690,298.76</u>
	<u>\$3,307,900.05</u>

All the factories were operated as near full capacity as available and suitable help would allow. Some minor extensions were made at several factories, and there is ample factory capacity for a further increased business, provided a sufficient number of workers can be obtained. Factories have been kept in thorough repair and up-to-date in all respects.

W. G. RYCKMAN INCORPORATES.

The business of W. G. Ryckman, the well-known crude rubber broker, 77 Broad street, New York City, will be conducted hereafter under the name of W. G. Ryckman, Inc. Mr. Ryckman is president, and C. B. Kaufmann, who has been associated with the business for a number of years, is secretary and treasurer of the newly formed corporation. There will be no change in the manner in which the business will be operated, the concern continuing to act as broker, as well as representative in the New York market of various foreign shippers at primary points.

HOOD RUBBER CO. EXTENSION.

The new tire plant of the Hood Rubber Co., East Watertown, will be one of the most thoroughly modern, and fully equipped factories in the country for the manufacture of tires. It is expected to be ready for operation some time this year. As soon as it is equipped and manned, the present output of tires will be trebled. The footwear department is running to full capacity. The line of rubber-soled canvas shoes is so attractive and popular that this branch of the business will be steadily employed well into the summer, while the rubber boot and shoe departments have orders on hand sufficient to keep them going to full capacity through the entire year.

Goodyear Cotton Mills, Inc., paid a regular quarterly dividend of $\frac{1}{4}$ per cent on preferred stock on April 2 to stockholders of record of that date.

The name of the Rubber & Celluloid Harness Trimming Co. of Newark, New Jersey, has been changed to the Rubber & Celluloid Products Co., as per certificate filed with the Secretary of the State of New Jersey.

NEW INCORPORATIONS.

Acme Tire & Supply Co., The, March 3 (Ohio), \$50,000. H. J. Alperin (president and general manager), Cleveland, Ohio; Morris Levine (secretary and treasurer), Pittsburgh, Pennsylvania. Principal office at 2009 Euclid avenue, Cleveland, Ohio, with branches in Detroit and Kansas City. To establish a chain of stores and garages and expand on a jobbing basis.

Ardmore-Akron Tire & Rubber Co., The, February 17 (Oklahoma), \$1,000,000. John C. Harmony and Charles A. BeSaw—both of Canton, Ohio; Elmer S. Wood, Ft. Smith, Arkansas. Location of plant, Ardmore, Oklahoma. Oklahoma City office is 112 Herskowitz Building, Oklahoma City. To manufacture rubber tires and other rubber products.

Atlas Auto Accessories, Inc., March 31 (New York), \$50,000. F. X. Carmody, 1114 Ocean avenue, Brooklyn, New York; G. A. McLaughlin, 61 Broadway, and J. T. Condon, 174 West Ninety-seventh street—both in New York City.

Bare Wire Co., Inc., The, April 11 (New York), \$500,000. Edwin W. Moore and G. F. Waterbury—both of 10 East Forty-third street; John S. Keith, 40 Wall street—all in New York City. Principal office, New York City. To manufacture water-proof and insulated wire.

Burdick Tire & Rubber Co., March 22 (Delaware), \$1,000,000. Herbert E. Latter; Norman P. Coffin—both of Wilmington, Delaware, and Clement M. Egner, Elkton, Maryland. Principal office with the Corporation Trust Co., Dupont Building, Wilmington, Delaware. To manufacture and deal in rubber and gutta percha and all goods of which rubber and gutta percha are component parts.

Commercial Tire & Rubber Co., Inc., March 26 (New York), \$1,000. Sydney Bernheim, 35 Nassau street, New York City, and C. A. Weldon, 591 Seventh street; H. H. Jacobson, 555 Grand street—both in Brooklyn, New York. To manufacture automobile tires, etc.

Cossey Tire & Supply Co., February 20, (Oklahoma), \$5,000. Wallace Cossey, Cora B. Cossey and J. Frank Davis—all of Muskogee, Oklahoma. Principal office, Muskogee, Oklahoma.

Couchois Tire Corp., April 17 (New York), \$50,000. Garrett J. Couchois, Rutherford, New Jersey; Rudolph Tiktin, and Joseph Klingenstein—both of 5 Nassau street, New York City.

Defender Tire & Rubber Co., March 22 (Delaware), \$2,000,000. F. R. Hansell, Geo. H. B. Martin—both of Philadelphia, Pennsylvania, and S. C. Seymour, Camden, New Jersey. Principal office with the Corporation Guarantee & Trust Co., Ford Building, Wilmington, Delaware. To manufacture and generally deal in solid and inflated tires and tubes.

Delta Auto Supply Co., Inc., April 4 (New York), \$10,000. Alfred V. Hines and Walter E. Ufer—both of 1074 Lexington avenue, and Bailey C. Elliott, 1400 Broadway—all in New York City. To deal in tires and auto supplies.

Dowse Rubber Co., March 14 (Delaware), \$2,500,000. John H. Redmond, 10 East Forty-third street; Walter S. Logan, 1142 Madison avenue, and Arthur Nikoloric, 55 Liberty street—all in New York City. To buy, sell, exchange and deal in any and all kinds of property, and to conduct a general trading, manufacturing, mercantile or mechanical business.

Erickson Tire Corp., April 6 (Delaware), \$300,000. Wm. Howard Hoople, 277 Brooklyn avenue; Walter Anderson, 1450 New York avenue, and Geo. M. Brooks, 109 West Forty-fifth street—all in Brooklyn, New York. Office with the United States Corporation Co., Dover, Delaware. To buy, sell, manufacture and deal in automobile tires, wheels, and accessories.

Exhausted Heated Vulcanizer Co., March 10 (Delaware), \$50,000. John Niason, Chas. W. Griffith and Ed. T. McGowan—all of Altoona, Pennsylvania. Principal office with the Capital Trust Co., Dover, Delaware. To manufacture and retail exhaust heated vulcanizers, automobile accessories and novelties.

Federal Vulcanizing Works, March 2, (Illinois), \$2,500. Henry B. Stulik, Otto Horacek, and J. M. Laventhal, 1103 Harris Trust

Building, Chicago, Illinois.

Flexible Armored Hose Corporation, April 16 (New York), \$50,000. Lester F. Gilbert, 724 Lafayette avenue; Edw. G. Kinkel, 117 Russell avenue, and C. Arthur Dutcher, 257 Elmwood avenue—all in Buffalo, New York.

Forbes Auto Supply Co., Inc., March 15 (New York), \$10,000. W. J. Brannen, F. E. Dunbar and R. N. Forbes—all of Olean, New York. To deal in auto supplies, tires, etc.

Frontier Auto Supply Co., Inc., March 12 (New York), \$1,000. Samuel W. Caplen, Harold Greenstein and Gerald Landau—all of Buffalo, New York. To deal in tires and other auto supplies.

Giant Tire & Sales Co., Inc., April 12 (New York), \$10,000. Jos. M. Johnson, Lenora Z. Johnson, and Arthur L. Dunton—all of Rochester, New York.

Indian Tire Sales Co., Inc., March 31 (New York), \$10,000. David B. Parker (president), 2657 Bainbridge avenue; Joseph M. Hetzer (vice-president and general manager), 152 West Sixty-fourth street—both in New York City, and John Barnett (secretary and treasurer), 1559 East Twelfth street, Brooklyn, New York. Factory at New Brunswick, New Jersey, and New York branch and service station, 246 West Sixty-fifth street, New York City. Distributer for the Indian Tire & Rubber Co., New Brunswick, New Jersey, manufacturer of solid rubber tires.

India Rubber Co., The, December 1, 1916 (Ohio), \$250,000. J. M. Alderfer (president); J. K. Williams (vice-president)—both of Akron; D. A. Grubb (secretary), Cleveland, and Paul C. Searles (treasurer), East Cleveland—all in Ohio. To manufacture automobile tires and inner tubes.

Illinois Tire & Supply House, February 26 (Illinois), \$5,000. James W. Bell, Paul E. Sheehan and Willis Melville. Principal office, Hilgrove and Fifth avenue, La Grange, Illinois.

Manufacturers' Tire & Rubber Co., Inc., The, January 9 (New Jersey), \$100,000. Eric Windmiller, 43 High street, Passaic; Herman Feder, 335 Belmont avenue, Newark—both in New Jersey, and Justin S. Galland, 25 Broad street, New York City. Principal office, 218 Halsey street, Newark, New Jersey. To manufacture and deal in automobile tires and tubes, etc.

Meyer Rubber Co., The, October 18, 1916 (Ohio), \$100,000. A. W. Ellenberger, C. A. Walter, Fred W. Hachel, O. M. Roderick, and E. L. Mallory. Principal office, Massillon, Ohio.

National Rubber Co. of New York, March 22 (Delaware), \$5,000,000. F. R. Hansell, Geo. H. B. Martin—both of Philadelphia, Pennsylvania, and S. C. Seymour, Camden, New Jersey. To buy, sell and deal in crude, refined and manufactured rubber.

The New Idea Double Tire Co., Inc., March 30 (New York), \$2,500. Ella A. Rosenbloom and Samuel Rosenbloom—both of 10 Suter Terrace, and Henry Johnson, 801 Dewey avenue—all in Rochester, New York.

Nesbit Sales Corporation, F. T., March 15, (New York), \$10,000. Frank T. Nesbit and Thorpe D. Nesbit, 468 Riverside Drive, and William N. C. March, 42 Broadway—both in New York City. To manufacture motors, engines, supplies, etc.

Niagara Vulcanizing Works, Inc., April 17 (New York), \$2,000. John Dietz, 357 Fifth street, Glenn A. Stockwell, 463 Eighth street—both of Niagara Falls, and Enoch Layer, 277 Prospect street, Lockport—all in New York. To repair tires, etc.

North Star Rubber Co., October 20, 1916 (Minnesota), \$250,000. J. C. Spillane, S. H. Greeley, and J. W. Laramy—all of St. Paul, Minnesota. Principal office, St. Paul, Minnesota. To manufacture all kinds of merchandise of rubber and gutta percha.

Pacific Tire & Rubber Co., March 16 (Washington), \$10,000. Ardo M. Peterson, Roy Peterson, and Leon E. Peterson—all of Seattle, Washington. To deal in automobile tires and accessories.

Pacific Tire & Rubber Co., Inc., April 3 (New York), \$2,000. Sydney Bernheim, 35 Nassau street, New York City; C. A. Weldon, 591 Seventh street, and H. H. Jacobson, 555 Grand street—both in Brooklyn, New York.

Pacific Tire & Rubber Co., January 11 (California), \$500,000. H. C. Wharfield, Otto Hasencamp, E. C. McDowell, Hugh K.

Walker, Jr., and H. C. Natter—all of Los Angeles, California. Principal office, Los Angeles, California.

Phoenix Rubber Co., The, March 19 (Ohio), \$125,000. Theodore Krumeich (president), F. R. Ormsby (vice-president), C. C. West (treasurer), and S. G. Ridgon (secretary and general manager). To reclaim rubber.

Plastic Inlay Rubber Co., March 26 (Delaware), \$500,000. F. D. Buck, Geo. W. Dillman and M. L. Horty—all of Wilmington, Delaware. To manufacture and sell automobile tires and tire tubes and rubber goods of all kinds.

Plexas Tire & Rubber Co., February 13 (Pennsylvania), \$50,000. William W. Moore (treasurer), 1338 Sixty-fifth avenue; Frederick Doriety, 4718 N. Twelfth street, and Walter Hess, 4914 Cedar avenue—all in Philadelphia, Pennsylvania. Principal office, Philadelphia, Pennsylvania. To manufacture, buy and sell rubber goods, automobile tires, tubes, accessories and any other articles of similar character.

Pneumatic Wheel Co., March 9 (South Dakota), \$2,000,000. Kay Todd, Walter Fosness, Arthur E. Nelson, and A. M. Joyce—all of St. Paul, Minnesota. Principal office, 510-512 Endicott Building, St. Paul, Minnesota. To manufacture the J. A. Borland wheel with solid rubber tire invented by Mr. Borland.

Porter Tire Sales Co., Inc., March 28 (New York), \$500. Daniel B. Nally, 125 Wall avenue, Mt. Vernon, New York. Thos. F. MacMahon and Bailey C. Elliott—both of 1400 Broadway, New York City.

Quality Tire Co., Inc., April 17 (New York), \$1,000. Sydney Bernheim, 35 Nassau street, New York City; Catherine A. Weldon, 591 Seventh street, and Harry H. Jacobson, 555 Grand street—both in Brooklyn, New York.

Resilient Fibre Co., March 5 (Delaware), \$500,000. Geo. B. McLeod, Lumberton, North Carolina; Edwin D. Chadwick, W. E. Brockman, J. L. Alverson, J. P. Price, and W. F. Eller—all of Washington, D. C. Principal office with the Corporation Co., of Delaware, 901 Market street, Wilmington, Delaware. To manufacture and sell a certain resilient fibre made of cotton or other material.

Republic Rubber Sales Co., February 21 (Ohio), \$10,000. John T. Harrington, Union C. Deford, Fred J. Hein, Clyde W. Osborn and J. W. Blackburn. Principal office will be located at Youngstown, Ohio. This company is formed to handle the sales of The Republic Rubber Co., of Youngstown, Ohio.

Saniton Specialty Co., Inc., April 7 (New York), \$5,000. Herman Stang, 1051 Boston Road, Joseph I. Wiesner, 706 East Sixth street—both in New York City, and Nicholas Lawner, 1626 Forty-fifth street, Brooklyn, New York.

Smoth Rubber Sheeting Co., Inc., March 28 (New York), \$5,000. Louis B. Silver, 864 Fox street; Louis Rosenbloom, 937 East 172d street, and John J. Hanley, 65 Fourth avenue, all in New York City.

Stylux Manufacturing Co., Inc., March 29 (New York), \$10,000. E. A. Falk, 150 East Sixty-first street; Harry E. Herman, 170 Broadway—both in New York City, and Jeanette A. Bravy, 254a Saratoga avenue, Brooklyn, New York. To manufacture rubber, cement, paints, etc.

United Vulcanizing Co., Inc., April 10 (New York), \$500. Anthony Fenninger, 565 Amsterdam avenue; Hermann Wurm, 246 West 106th street, and Jos. A. Fenninger, 1328 Edwards avenue—all in New York City. Tire repairing, etc.

Valley Tire Co., March 13 (Tennessee), \$5,000. Albert Wooldridge, Latham Wooldridge, O. N. Wilkins, R. F. Katz, and E. G. Riddick. Principal office, Nashville, Tennessee, to buy and sell autos, tires, etc.

Western Tire Brokerage Co., March 23 (Missouri), \$4,000. John C. Shaffner, Mabel L. Bartling, and Josephine C. Turner—all of St. Louis, Missouri. Principal office, St. Louis, Missouri.

THOMAS L. ROBINSON.

ALTHOUGH perhaps having a wider experience in financial and legal circles than in rubber manufacture, the subject of this sketch occupies the important position of president of

the Republic Rubber Co., Youngstown, Ohio, and during the seven or eight years that he has been connected with it, the company has shown steady and material progress.

Thomas L. Robinson was born in Ravenna, Ohio, June 28, 1880. His father was a prominent jurist. Among his ancestors he can count those who were officers or soldiers in the three principal American wars, the Revolution, the War of 1812, and the Civil War.



THOMAS L. ROBINSON.

After completing his education at Western Reserve Academy and the University of Michigan, Mr. Robinson entered the practice of law at Youngstown, Ohio. In 1907-8 he organized the Wick Brothers Trust Co. and became its president. This was later consolidated with the Dollar Savings & Trust Co., of which he was made vice-president. He became a director of the Republic Rubber Co. in 1910, and the next year was elected its president, an office he has held ever since.

Mr. Robinson is a public-spirited man, prominently connected with other institutions in Youngstown. He is a director in the First National Bank, the Realty Trust Co., the Union Safe Deposit Co., and is interested in other local institutions. He is a member of the Youngstown Club, the Youngstown Country Club, Poland Country Club, Zeta Psi, Phi Delta Phi and Phi Beta Kappa fraternities, Military Order of Loyal Legion, Sons of American Revolution, Ohio Society of New York, the Bankers' Club of New York, and The Rubber Association of America, Inc.

COTTON FABRIC TRADE NOTES

THE Bibb Manufacturing Co., Columbus, Reynolds and Macon, Georgia, has just completed a mill at Porterdale, Georgia, with 20,000 spindles and 100 looms for manufacturing cotton duck.

O. A. Barnard announces that he has severed his connection with the firm of J. H. Lane & Co., New York City.

The Cannon Manufacturing Co., Concord, North Carolina, is enlarging its plant to add to its product the manufacture of tire fabrics, which, like the present output, will be sold through Cannon Mills, New York and Philadelphia.

Clarence F. Holmes, formerly secretary of R. J. Caldwell Co., Inc., New York City, is now associated with the Butterick Publishing Co., New York City.

THE DECLINE OF RUBBER IN PHOTOGRAPHY.

JUST as the march of progress is ever creating new uses for india rubber, so it occasionally eliminates a few of the earlier applications, for the history of scientific development is also a record of the survival of the fittest. However well rubber, or any other substance, may perform the function required of it, a new process or substitute device may at any time revolutionize the art to which that substance had been applied and so relegate it to the limbo of the past. In photography, for instance, the applications of rubber are gradually but surely diminishing in number. While in a sense regrettable, this side of the rubber industry in any field presents beneficial lessons deserving more than passing thought, and it is in this spirit that the following instances are cited.

Only two or three years ago most cameras had a rubber bulb and tube to operate the shutter. This equipment had to be replaced frequently and for the most part has now been replaced by the antinous or flexible cable release which conveys no vibration to the camera yet will last as long as the camera itself. While hard rubber still supplies the leaves and iris diaphragm of many shutters and lenses, as many more now on the market and made of very thin sheet steel are giving satisfaction and have the advantage that they never crack where pivoted. Hard rubber plate-holder slides have for the most part given way to leatherboard and other specially prepared cardboards of smooth, hard surface. These are cheaper and do not become electrified by friction in handling nor attract dust to the plate like hard rubber. Developing trays and tanks of hard rubber are still stocked by most photo-supply dealers, but seem to render no better service than the cheaper receptacles of glass, fiber, agate and artificial stoneware.

India rubber cloth, by which is meant cotton fabric coated on both sides with a thin film of rubber, still has its photographic uses, although not to the former extent. India rubber focusing-cloths are opaque, as such cloths should be, and are of additional value in protecting the camera during bad weather. Cut pieces of rubber fabric or sheet rubber have long been employed in the printing-frame, back of platinum paper, as a protection from dampness. Once finished, however, a platinum print is a thing of rare beauty and as near absolute permanence as anything known to photography, but the scarcity and high cost of platinum have restricted the use of this medium, and like all sun-printing papers it is gradually giving way to the more easily worked gaslight papers.

Another printing accessory now rarely seen is the squeegee-pad for glazing prints to a high gloss surface. It consists of a sheet of celluloid placed between two covers of india rubber cloth, the wet prints being applied face down to both sides of the celluloid, the rubber covers brought over them and a roller squeegee being applied over the fabric to bring print and celluloid into close contact for drying. Photographers gradually came to the conclusion, however, that the rubber sheeting was superfluous, and that the ferrotype tin of today lasts longer, gives a better gloss and is less likely to stick to the print. And here again low first cost also became a contributing influence.

In photographic processes rubber is holding its own better than in apparatus and accessories, although the amount consumed in the former is inconsiderable. It found favor for a time as a mountant of glazed and dry prints without cockling, a solution being prepared with carbon disulphide and 5 per cent absolute alcohol. It was discovered, however, that the rubber perishes in time and leaves the mount.

Pure washed and masticated, unvulcanized rubber was formerly employed as an edging for wet-plates to prevent the collodion coating from leaving the glass, but the faster gelatine dry-plate has superseded its predecessor for all work except photo-engraving, and is making inroads upon that field as well.

In the collotype process of ink printing from a specially prepared photographic glass positive, india rubber solution is used for attaching to the negative the tinfoil used for masking, but the collotype process has fallen into disfavor to a considerable extent, with the development of half-tone, photogravure and other etching methods.

In photo-engraving, a solution of india rubber in benzol of 2 per cent strength is used for stripping wet collodion films. The collodion negative is flowed with the rubber solution, and when this is dry it is again flowed with stripping-collodion. The rubber solution prevents the solvents of the stripping-collodion reaching the original collodion film, and at the same time increases the flexibility and toughness of the film.

India rubber solution continues to be used in aerograph or air-brush retouching because it possesses a distinct advantage over other stopping-out mediums applied to shield certain portions of the print on which the aerograph spray is not wanted. Whereas most other mediums require the application of a solvent for their removal after the spraying has been completed, the rubber film peels off easily upon rubbing with the finger-tip and carries with it any spray that may have spread beyond the desired boundaries.

Thus the instances cited make it plain, were this necessary, that no primary use of rubber will persist unless rubber in its particular application has important, desirable qualities and distinct advantages peculiar to itself; also that as an accessory its continuance is dependent upon the fate of the device or process in connection with which it is employed. It cannot long compete with substitutes of lower cost which answer the purpose equally well. The big rubber markets will ever be associated with those articles greatly in demand which cannot be manufactured of any other substance.

DAYTON RUBBER MANUFACTURING CO. BUILDS MODEL PLANT.

Building operations have begun on the new plant of The Dayton Rubber Manufacturing Co., Dayton, Ohio. The site comprises 21½ acres of ground, with a frontage on the Pennsylvania Railroad of about 1,500 feet, affording ideal shipping facilities. The main building will be about 500 feet in length and 150 feet in width, part of which will be one story 20 feet high and part three stories, and is so planned that plenty of light will be provided in all parts of the plant, which will be constructed of structural steel, concrete and brick.

The second story will be used for offices and the third story will be arranged for a large hall for the employes and their friends. The ground not occupied by buildings will be set aside for a ball field, tennis courts, etc., for the benefit of employes. The power plant will occupy a separate building, 70 by 90 feet, and the boilers will all be equipped with stokers to eliminate smoke.

The Dayton company manufactures both airless and pneumatic tires, and the new plant will have a capacity of 1,000 tires per day, nearly 1,000 men being employed. John A. MacMillan is president and general manager.

DU PONT COMPANY ACQUIRES HARRISON BROTHERS PROPERTY.

Through the purchase of Harrison Brothers & Co., Inc., Philadelphia, Pennsylvania, by E. I. du Pont de Nemours & Co., Wilmington, Delaware, two of the oldest manufacturing concerns in this country have united, the Harrison business dating from 1793 and that of the du Pont from 1802. The new corporation conducting the business of Harrison Brothers in chemicals and pigments will be known as Harrisons, Inc., but the organization remains practically the same.

The Mantua Chemical Co., Camden and Paulsboro, New Jersey, a part of Harrison Brothers, is also included in the transfer to the du Pont company, the business being continued under the name, Mantua Chemical Co.

LEE RUBBER AND TIRE CORPORATION REPORT

In presenting the first annual report of the Lee Rubber & Tire Corp., Conshohocken, Pennsylvania, A. A. Garthwaite, president, stated that the discontinuance of dividends at the January meeting was due to the high cost of materials and additions to the plant and equipment, which will result in benefit to the stockholders.

The treasurer's report follows:

CONSOLIDATED BALANCE SHEET.

December 31, 1916.

ASSETS.

Cash	\$258,560.45	
Accounts receivable	349,777.47	
Notes receivable	8,414.85	
Lee Tire Sales Co., Inc., N. Y., current account	112,312.83	
Inventories	1,601,442.70	\$2,330,508.25

Charges deferred to future operations	28,540.90	
Investment—stock of Lee Tire Sales Co., Inc., N. Y.	500.00	
Plant and equipment	1,206,229.11	
Patents, trade-marks, etc.	400,300.00	
		\$3,966,078.26

LIABILITIES.

Accounts payable and accruals	\$75,814.37	
Notes payable	1,000,000.00	\$1,075,814.37

Reserves:		
Depreciation of plant and equipment	\$191,661.35	
Adjustment of tire claims	38,633.19	
Income tax	9,982.87	240,277.41

Declared capital, in accordance with the Stock Corporation Law of the State of New York... \$750,000.00

Stock—Authorized150,000 shares
Unissued 50,000 "

Outstanding100,000 "

Working capital, being cash and actual book value of securities owned in excess of required declared capital 1,883,591.09 2,633,591.09

Surplus 16,395.39

\$3,966,078.26

CONSOLIDATED PROFIT AND LOSS AND SURPLUS ACCOUNT.
For the Year ended December 31, 1916.

Net sales \$3,587,761.29
Cost of goods sold, including freight, selling, administrative and general expenses 3,343,860.29

Gross operating profit \$246,901.00
Income from rentals, etc. 4,162.16

\$251,063.16

Deduct:
Reserve for income tax \$9,982.87
Interest and discount—net 3,743.29

Net profit for year \$237,337.00
Less dividends paid 225,000.00

Surplus for year \$12,337.00
Add adjusted surplus January 1, 1916 4,058.39

Surplus December 31, 1916 \$16,395.39
HORACE C. COLEMAN, Treasurer.

The recently elected officers and directors of this company are as follows: John J. Watson, Jr., president; A. A. Garthwaite, vice-president and treasurer; D. W. Pinney, assistant treasurer and assistant secretary; Henry Hopkins, Jr., secretary. Directors: John J. Watson, Jr., J. W. Prentiss, G. M. P. Murphy, Stephen B. Fleming, Samuel H. Miller, all of New York City; Jos. Wayne, Jr., Philadelphia, Pennsylvania; J. W. Johnson, New Brunswick, New Jersey; Horace C. Coleman, Norristown, Pennsylvania; A. A. Garthwaite, Conshohocken, Pennsylvania.

PROGRESS OF CROWN TIRE & RUBBER CO.

The Crown Tire & Rubber Co., now located in temporary quarters in Ralston, Nebraska, a manufacturing suburb of Omaha, expects to occupy its new plant by July 1. The new building will be 130 by 60 feet, three stories high, with a separate boiler house about 30 feet square. This will afford a daily capacity of 500 automobile tires and tubes, and the company will also manufacture motor cycle tires, tire accessories, and, eventually, mechanical rubber goods. H. A. Reichenbach is president and general manager, and E. A. Miller, formerly of Akron, Ohio, superintendent.

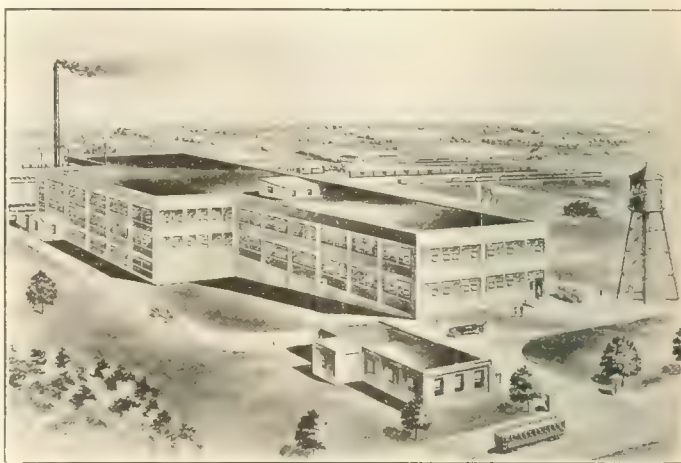
THE RUBBER TRADE IN AKRON.

By Our Regular Correspondent.

A VALUABLE contribution to the industrial progress is embodied in the recent establishment by several Akron rubber factories of 30 scholarships in the engineering college of the Municipal University of Akron. The candidates will be chosen from high school graduates and the scholarships will cover all tuition, incidental and laboratory fees. The course will be on a cooperative basis, including alternate two-week periods in factory and college, thus bringing the student into practical relation with the various problems in every department of the industrial organization. Each student will receive from the company employing him, \$37.50 for each two-week period of work, and at the end of the four-year course will have the opportunity of a permanent position in the organization in which he has been trained.

* * *

The proposed trebling of capacity in the plant of the Mason Tire & Rubber Co., at Kent, to 1,500 tires per day necessitates additional working capital and an increase from \$1,000,000 to \$3,000,000 was ratified at the stockholders' meeting on the fifth



MASON TIRE & RUBBER CO. PLANT WITH PROPOSED ENLARGEMENT.

of last month. The company started manufacturing tires in October, 1916, and its growth has been remarkably rapid. Over 200 distributors and dealers in the United States now handle Mason tires and tubes, and three direct factory branches are maintained in New York City, Cleveland, Ohio, and Kansas City, Missouri. A large warehouse is now under construction at the home plant, a modern office building will be erected this summer, and the main plant extensions will begin in the early fall. The architects' drawing of the completed factory is shown in the accompanying illustration.

* * *

The B. F. Goodrich Rubber Co. has recently been organized as the selling organization of The B. F. Goodrich Co. The Goodrich products will henceforth be identified with the new name, the original company, however, remaining as the owning and operating concern.

Several officials of the Goodrich company, acting as individuals, have solved the high cost of living problem by fitting up a club house with accommodations for 50 men. The name of the new club is the "Chelsea" and its present members, numbering 20, find the cooperative plan of living more economical and also more enjoyable. The club house is three stories high, with ten large rooms and a dormitory occupying the entire third floor. It is reported that the Chelsea Club is the pioneer in a series of similar experiments for single men employees.

* * *

The metric system for determining weights and measures, standard in all European countries, has now been adopted by The

Goodyear Tire & Rubber Co., and classes in the Goodyear factory school have been organized among the foremen and inspectors of the plant, that they may become thoroughly familiar with the system before applying it to the activities of the factory. Our United States monetary system, with its decimal denominations, is really a division of the metric system, which has the same advantage over our old method of weights and measures with their units of inches, pounds, quarts, etc., that our system of coinage has over the pounds and shillings of Great Britain or the francs and sous of France.

Building operations may soon begin on Goodyear Hall, a \$450,000 building for the exclusive benefit of Goodyear employees. The size of the building will be 170 by 400 feet over all, the front four stories high and the rear two stories. An immense gymnasium, with a seating capacity of 5,000 and swimming pool adjoining, will provide opportunity for all kinds of indoor athletics, and there are to be school rooms, lounging, smoking and reading rooms, and complete equipment to supply the entire recreational needs of the large Goodyear working force.

The Goodyear company also has a fine athletic field of 40 acres, and Coach I. Ray Martin, for the past three years director of athletics at Heidelberg University, Tiffin, Ohio, has recently been appointed athletic director of the company.

* * *

At a stockholders' meeting on the tenth of last month, the capital of the Swinehart Tire & Rubber Co. was increased from \$800,000 to \$1,500,000, \$200,000 in common stock and \$500,000 preferred. The regular quarterly dividend was declared.

* * *

The Miller Rubber Co. has installed a new fire alarm system comprising the modern equipment of signaling apparatus with ten alarm boxes operated by breaking the glass and pulling the lever. These new call boxes and the factory whistle will automatically sound the number of the box four times in quick succession.

* * *

M. D. Tenney, for many years connected with the factory organization of the Kelly-Springfield Tire Co., has been appointed manager of the adjusting and salvage department, succeeding R. B. Pierce, now manager of the Cleveland branch.

THE RUBBER TRADE IN BOSTON.

By Our Regular Correspondent.

NEVER before has the National Guard in this vicinity been supplied with rubber overshoes. Last month, simultaneously with the declaration of war, New England was visited by a heavy snowstorm—one of the left-overs of last winter. It was deemed necessary to guard a number of points in or near Boston, and the inclemency of the weather, the soft, slushy condition of the ground where these men were picketed, and the fact that many of them were not supplied with shoes calculated to withstand such service, was quickly recognized, and at once orders were given to supply these soldiers with rubbers. The kind decided upon were heavy storm overs, and it was at once found that few such rubbers were in stock in the various wholesale houses. After considerable scurrying around, the Hood Rubber Co. and the United States Rubber Co. filled the order, and the sentinels were enabled to patrol their beats in greater comfort.

* * *

A proof of the growing interest in the history and methods of rubber manufacture is the steady demand by schools, colleges, clubs and debating societies for samples of rubber and compounding ingredients. Probably every rubber manufacturer has requests for such samples every week in the year. While an individual fulfillment of such a request would not be very great, even at present rubber prices, the aggregate cost of the large number would involve a considerable amount, both for material

and time. So great has been this demand that the Hood Rubber Co., Watertown, has seized the opportunity to popularize its products and make friends with the many persons or institutions asking for such favors and has had prepared an "Educational Exhibit." This consists of a neatly boxed card, to which are attached samples of various kinds of rubber, vials of the most prominent compounding ingredients and miniature aluminum boot and shoe lasts. These exhibits, which fill the wants of school teachers, are sold at a dollar each, and as they contain an advertisement of the company are, at the same time, of real publicity value.

* * *

The United States Rubber Co., having completed its pension plan, decided that the details should be given to the employees of its subsidiary companies by the officers of those companies. There are many employees in these companies who are of foreign birth, and some who might not fully understand that they were included among the prospective pensioners of the United States Rubber Co. An interesting feature of this announcement was the address given by Vice-President Ira F. Burnham at the Stoughton factory of the American Rubber Co. As several nationalities are represented among the workers there, Mr. Burnham called all the employees together and asked them to group themselves according to the language with which they were most familiar. An interpreter was stationed with each group and Mr. Burnham then explained in English, a paragraph at a time, the new pension plan. After each point was explained, the interpreters addressed their groups. Questions were propounded, which were answered by Mr. Burnham, and when all the groups fully understood this point, another was explained in like manner. The workers felt free to ask questions, as they would not be inclined to do, were the meeting formal, with only one speaker and he talking English on a platform. The plan was admirably conceived and excellently worked out, with the result that Mr. Burnham has been invited to explain the plan in other plants of the United States Rubber Co.

* * *

The Monatiquot Rubber Works Co., South Braintree, departed from its regular custom of celebrating its birthday, because of war conditions. In order that its employees might participate in the public celebration of Patriot's Day the factory was closed down. In posting notices in the various departments, notifying of the shut-down, announcement was made of a ten per cent increase to all who had been employed more than three months. The dedication of mill building No. 4, which had been arranged to be held April 19, was postponed, and if present plans are carried out, will take the form of an old-fashioned party given to the employees and their families.

* * *

Ten simultaneous flag raisings, one each on the ten principal buildings of the Boston Woven Hose & Rubber Co., Cambridge, on April 11, were accompanied by a procession of 1,750 employees, headed by a fife and drum corps, led by Vice-president and Manager George E. Hall, Treasurer Henry B. Sprague, Mayor Rockwood and the heads of the fire, police and building departments of the city of Cambridge. At the close of the parade the entire company assembled in the large factory yard, where, to the accompaniment of the fife and drum corps, and the factory bugler, the "Star Spangled Banner" was sung by all present.

* * *

The importance of air-brake hose was exemplified at the South Terminal Station in this city one day last month, when a large number of trains arriving in Boston were held from 15 to 30 minutes, causing a serious track congestion. A train was backing out of the station when the air-brake hose collapsed. This set the brakes on all the cars, and the only way to release the brakes was to do so with each individual car, a process which took half an hour to accomplish. This happened in that part of

the yard where many tracks converge or cross each other, thus holding up trains entering or leaving the station.

* * *

F. H. Appleton & Son, Inc., rubber reclaimer, has become a Massachusetts corporation, though originally incorporated under Maine laws. No change has been made, either in the list of officers and directors, or in the capitalization, which is \$400,000.

* * *

The trustees of the Forsyth Dental Infirmary on April 10 tendered the use of this establishment to the National Government, through Senator Lodge. The condition of soldiers' teeth is of prime importance in time of war, and this great infirmary, given to the City of Boston by a rubber manufacturer, is probably the finest of its kind in the world.

The Lynn Rubber Manufacturing Co. is now making an arch support for wearing in the shoe for the relief and correction of fallen arch, which is composed partly of sponge rubber, thus forming an elastic cushion, exerting a gentle pressure at the point needed.

Dan C. Swander, manager of the Boston store of the Firestone Tire & Rubber Co., resigned that position last month to become sales director of the Standard Parts Co., Cleveland, Ohio, a combination of several companies, including the Western Spring & Axle Co., the Perfection Spring Co., the Standard Welding Co., Cleveland, and the Bock Bearing Co., Toledo, Ohio. It is reported that the company will employ 8,000 to 9,000 men in the various plants and consume 175,000 tons of steel annually. Mr. Swander has been connected with the automobile and tire industry for a number of years, and has been very successful as a sales organizer and builder.

* * *

Jack T. Clinton succeeds Mr. Swander as manager of the Boston branch of the Firestone Tire & Rubber Co. For several months last year he was acting manager of this store, and later was appointed manager of the Buffalo branch of the company. His friends in the trade, and especially those in Boston, are congratulating him on his advancement and his return to this city.

* * *

Forty students of Harvard University, who are specializing in chemistry under the guidance of Professor Jones, made a tour of inspection of the Hood Rubber Co. factory at Watertown recently. Every office employe of the company is now wearing an American flag as an emblem of patriotism in this critical time, while every office is decorated with the Stars and Stripes.

* * *

The bowling league of the Hood Rubber Co., Watertown, celebrated the closing of the season by holding its sixth annual banquet at Convention Hall in this city, April 12, more than 300 being present. Prizes were awarded and the minstrel troupe furnished entertainment. This troupe also gave a special performance at Nutting's boathouse, on the Charles river, raising a goodly sum for the American Red Cross Society.

* * *

The Fisk Social and Athletic Association of The Fisk Rubber Co., Chicopee Falls, has offered to the United States Government, for mobilization purposes, its athletic field in Springfield. This park contains 45 acres, has stable accommodation for 150 horses, water from the city mains, is on a line of trolley cars and not far from two main line railroads from which a spur track could easily be laid. The Fisk Rubber Co. stands behind this offer to the Government, and if it is accepted, will provide an athletic field for its employes in some other location.

* * *

The Boston Chamber of Commerce has under consideration the creation of a Foreign Trade Bureau or a Foreign Trade Council.

A committee of five has been appointed to consider its feasibility and, if possible, to formulate a plan for such an organization.

* * *

The Converse Rubber Shoe Co., Malden, which manufactures tires as well as footwear, has increased its authorized amount of common stock from \$75,000 to \$375,000, and will use \$285,000 of the increase to pay a 380 per cent stock dividend. The remaining \$15,000 will be left in the treasury. The company now has \$1,375,000 preferred and \$375,000 common stock authorized.

* * *

The Para Rubber Co., dealer in tires and mechanicals, formerly at 112 High street, has moved to a larger store at 43 High street.

* * *

Francis H. Appleton has just returned from a vacation at Virginia Hot Springs, where he spent much time on the golf links, with the result that he weighs no more to-day than he did prior to his departure from Boston.

THE RUBBER TRADE IN TRENTON.

By Our Regular Correspondent.

GEORGE GRAHAM, JR., assistant treasurer of the Delion Tire & Rubber Co.; John Carter, plant superintendent, and Harry A. Pfizinger, head bookkeeper, are at St. Francis Hospital in a serious condition as a result of an explosion and fire at the Delion plant. Thomas Curtis, employed as an expert machinist by the Thropp company, who happened to be at the tire factory when the explosion occurred, is also at the hospital. The men were terribly burned about the face and arms and it is feared some of them may not recover their sight.

These men, together with several mechanics, were assisting in or watching the frictioning of some stock, in the process of which a new compound was being used. They were watching the action of this compound when a spark from the machine caused an explosion. The compound was plastered into the faces of those nearest the machine. In another instant flames were shooting through the room and it was with difficulty the men were saved from being burned to death. A dozen workmen employed about the room were painfully burned. A large amount of stock in the room was ruined, but the flames did not disable the plant. This is the second fire to visit the Delion factory. The plant is unusually busy and a new addition is now under way. When this is completed it will enable the factory to double its output.

* * *

The Ajax Rubber Co. has taken possession of its extensive new factory addition, which relieves a badly congested condition at the main factory adjoining. The new plant enables this company to produce several thousand more tires and tubes annually.

A flag raising was held last week at the Ajax plant. The Second Regiment band provided music for the occasion. A company of militia was present, and several thousand people assembled to witness the ceremony.

* * *

The Z. Z. Tire & Rubber Co. will shortly begin to do its own compounding. The company has hitherto had this done at one of the Trenton rubber mills.

* * *

The Globe Tire Co. has removed its executive offices from Trenton to 1851 Broadway, New York City. The billing and a large part of the correspondence will be done in the future from the New York headquarters. This concern recently completed a three-story addition, 50 by 200 feet, for making tires.

* * *

The James E. Thropp Sons' Co., maker of rubber machinery, has given contracts for the erection of an office building to cost \$22,000. The building will be of tapestry brick and Indiana limestone. Fireproof vaults will be provided on each of the floors.

* * *

As a result of "Wire Your Home" campaign conducted by the

Trenton Electric Club, scores of Trenton homes are being wired for electricity. The campaign was successful far beyond the hopes of the club.

* * *

Work is progressing rapidly on the new plant of the Westinghouse Lamp Co. in North Trenton. The plant will cover several acres.

* * *

John A. Lambert, of the Acme Rubber Co., presided at a meeting held for the purpose of planning for the mobilization of Trenton's industrial establishments in view of war time needs.

THE RUBBER TRADE IN RHODE ISLAND.

By Our Regular Correspondent

FOR many years the manufacture of rubber goods has been prominently identified with the industrial history of the State, but the past two years has materially increased its standing and it is now one of the six leading industries. Present indications point to still further expansion. Every plant is flooded with orders, many of them for immediate delivery; but the handicap of shortage of labor and the high cost of material are deterrent factors in necessary enlargements that would, under ordinary conditions, be made at once.

But the help proposition is not merely a local one, as the frequent advertisements in the want columns of the daily newspapers attest. These offer very alluring terms and conditions, which, however, have not proved sufficiently tempting to call any great number of operatives from the Rhode Island factories. One of the most recent calls has been from the Rubber Insulated Metals Corp., of Plainfield, N. J., for experienced tire makers, offering permanent employment at \$4.50 to \$5 a day. But local rubber concerns are also calling for additional operatives through the same mediums and there is no necessity for even an ordinary worker leaving Providence and vicinity for steady employment at good wages.

* * *

Maurice C. Smith, for several years assistant treasurer at the National India Rubber Co., Bristol, has been promoted to treasurer to succeed A. H. Emerson, who has become sales manager of the company's insulated wire department.

Alvin M. Bullock, who has been employed at the factory of the National India Rubber Co. for the past 20 years, during 18 of which he has worked in the outsole cutting department, has severed his connection with the company. During the latter period Mr. Bullock estimates that he has cut out more than six million pairs of outsoles. His associates presented to him a handsome gold monogram ring.

* * *

The employees of the Crocker System Rubber stores, of which the Hope Rubber Co., of Providence, and the Newport Rubber Co., of Newport, are a part, tendered a reception and dinner to Isaac Crocker, of Providence, at the Narragansett Hotel, that city, in honor of his sixtieth birthday on Easter Sunday. The occasion was devoid of all formality, although everyone present was called upon by the toastmaster, Henry J. Callahan, manager of the Salem store. To Mr. Crocker was presented a handsome silver loving cup by his employees, and during the festivities Charles P. Lanning ("Lan"), the famous cartoonist, drew character sketches. The Crocker System Stores represented on this occasion included Hope Rubber Co., Providence, Rhode Island; Worcester Rubber Co., Worcester, Massachusetts; Lawrence Rubber Co., Lawrence, Massachusetts; The Crocker Rubber Co., Brockton, Massachusetts; Granite State Rubber Co., Manchester, New Hampshire; Salem Rubber Co., Salem, Massachusetts; Haverhill Rubber Co., Haverhill, Massachusetts; Newport Rubber Co., Newport, Rhode Island, and Fitchburg Rubber Co., Fitchburg, Massachusetts.

* * *

Patriotism is manifesting itself throughout this State as never

before, and the employees of manufacturing plants of all kinds are vying with each other in the display of flags and the holding of patriotic exercises at the ceremonial raising. The various plants representing the rubber industry are among the establishments that have placed themselves on record. At the National India Rubber Co., Bristol, not only have large flags been placed in the several departments, but several hundred of the operatives have joined the Red Cross. On one day, recently, eight large flags were unfurled at the factory, six in the stitching room and two in the shoe room. Officers of the company were present and appropriate exercises were held in each room. Addresses were made and all joined in singing patriotic songs.

The employees of the Revere Rubber Co. held their flag raising on Patriot's Day, April 19, more than 1,000 of the employees being present at the celebration, each being presented with an American flag pin. The program included a medley of patriotic selections by an orchestra composed of employees and a very interesting address by W. T. Mead, dressed in Colonial costume, on the history of the American flag. At the conclusion of Mr. Mead's address bugle calls were sounded and "The Star Spangled Banner" was sung as the flag was unfurled. A salute was then given the flag together with a pledge of allegiance and the singing of "America."

* * *

Terence McCarthy, owner of the Narragansett Rubber Co., Bristol, who has been at St. Joseph's Hospital, Providence, for several weeks, returned to his home in Bristol about the middle of the month. He has been suffering from a complication of nervous troubles.

A new smoke-stack, 65 feet in height, has been erected at the main boiler room of the Narragansett Rubber Co.'s factory to replace the one blown down during a gale a few weeks previously.

* * *

A dozen or more young women fainted from excitement and fear early on the afternoon of April 5, as they were making their escape from the glove room of the Revere Rubber Co.'s plant on Valley street, after a bottle of strong acid had fallen to the floor in the chemists' room adjoining. They were taken to the factory hospital where they were treated. A fire was caused when the acid from the broken bottle mixed with other acids, and the flames spread rapidly, although they were soon extinguished. The damage did not exceed \$500.

* * *

The Empire Auto Supply Co., 86 Empire street, Providence, is owned and conducted by Maurice Greenwald, 611 West 127th street, New York City, and Edgar E. Cohn, Winchester Hotel, Syracuse, New York, according to their statement filed at the local city clerk's office.

* * *

Charles H. Frucht has filed a statement with the city clerk of Providence that he is the owner of the O. K. Cycle Shop, 371 South Main street.

* * *

The 'trade certificate of the Smith Webbing Co., doing business in West avenue, Pawtucket, was filed recently with the city clerk's office in that city. The name signed as sole owner is Everlastik, Inc., 52 Chauncey street, Boston.

* * *

Fourteen concerns submitted bids for 3,000 feet of fire hose, and contracts have been awarded by the Woonsocket City Council committee on fire department as follows: C. H. Darling Co., Woonsocket, 500 feet of Grey King brand, 90 cents a foot; Combination Ladder Co., Providence, 500 feet safety fire department wax and para gum-treated hose, 90 cents; Eureka Fire Hose Co., Boston, 1,000 feet at 67½ cents.

* * *

The New England Tire Co., 144 Fountain street, Providence, is being conducted by Victor P. Hendrick, 181 Magnolia street, Auburn, according to statement filed at the city clerk's office.

The Rubber Trade in Great Britain.

By Our Regular Correspondent.

THE somewhat panicky buying of rubber during the latter half of February did not go far in raising prices, which remain at much the pre-war level in contradistinction to most other raw materials of industry. Of course, if the largely increased output promised from the Eastern plantations for 1916 had not matured, no doubt we should have seen much higher prices owing to the war demand. As it is, this had neutralized the loss of the Central Empire's market and prevented what many predicted for 1917, viz., a slump in prices owing to over-production.

Outside government work it cannot be said that trade is very brisk and among exporters especially there is a feeling that a very quiet time is ahead. With the practical cessation of pleasure motoring the tire branch is, of course, greatly affected. A good deal of export trade, especially with Scandinavia, is much hampered by the lack of shipping facilities.

"RUBASTIC" AND RUBBER.

The legal case in which the late manager of the "Rubastic" works sought damages for dismissal, resulted in a verdict for the defendants, the directors of the concern. It was given in evidence for the defense that "Rubastic," which was supposed to be a non-rubber substance of substantial merit, really owed its merits to an admixture of rubber. This may or may not have been a fact, as the plaintiff denied this, but whether or no, the case calls to mind more than one proprietary non-rubber article which has made a fleeting appearance on the market in the past and, in which, when a legal case was the sequel to a dispute, it was shown that what merit the material possessed was due to a judicious admixture of the old established body, rubber. It is quite possible that "Rubastic" does not contain rubber as ordinarily made, but that its properties can be so improved by an addition of rubber that a super "Rubastic" has been made containing a proportion of rubber. The rather delicate question then arises as to how it ought to be designated. Goods which contain no more than ten per cent of rubber and a lot of substitute are regularly sold as rubber goods without any outcry being heard, though one of these days it may be enacted that the title shall be that of the major and not the minor constituent.

A FORERUNNER OF FUTURE LABOR PROBLEMS

There have been many prophecies to the effect that most if not all of the belligerent countries are in for labor troubles after the war, mainly because of the disinclination of workers to take more normal wages than those which have been paid in the rush and stress of war goods production. The rubber trade has already had its beginning without waiting for the termination of hostilities. In a Northern police court a waterproofing firm claimed damages from some men who left without giving due notice upon being put on ordinary work because the government work at which they could earn more money had come to an end. It was stated, incidentally, that boys were earning up to \$8 per week. The case was decided in the manufacturer's favor.

WATERPROOFING INDUSTRY SCHEDULED BY THE GOVERNMENT.

The rubber manufacture, as also the waterproofing of material with non-rubber substances, have been scheduled by the Government as businesses of primary importance. This means that man power may not be compulsorily withdrawn so as vitally to affect the carrying on of any works, and also that new hands may be engaged as and when required. In the case of non-essential industries this cannot be done. Naturally there are many differing opinions among individuals as to whether particular trades are

or are not essential. Even in rubber manufacture it would be difficult to prove that all the output is essential.

EAST AFRICA PLANTATIONS.

At a recent meeting of the East Africa Rubber Plantation, Inc., with the Tewa Rubber Estates, Limited, the Kamna Rubber Estates, Limited, and the Muhesa Rubber Plantation, Inc., for the purpose of considering the policy to be pursued in the immediate future in what was formerly German East Africa, it was decided to amalgamate at the first opportunity. There is to be an independent valuation of the assets of each company and in the meanwhile the companies are to work together so as to effect the greatest economies in administration. The fact that in the last year the East Africa Rubber Plantation, Inc., expended only £50 shows that there is not much prodigality to subjugate.

THE RUBBERINE COMPANY, LIMITED.

At the annual meeting of this company it was announced that Edward Taffen had been appointed chairman in place of the Hon. A. R. S. Douglas, who is on active service. A. T. Marks, the manager, has been appointed managing director. A ten per cent dividend was declared. This progressive company, which has been located at Hornsey, London, has now practically completed a new works at Market Road, London, N.

MOTOR TRUCK RIDES FOR SOLDIER CONVALESCENTS.

A frequent sight in many of the large cities is a truck load of sick and wounded soldiers out for an airing. It has come



WOUNDED BRITISH SOLDIERS TAKING AN OUTING.

to be a common practice for many business houses to loan their trucks or automobiles for such purposes. A happy party of this kind is shown in the motor-lorry loaned by the London Good-year company.

THE INDIA RUBBER MANUFACTURERS' ASSOCIATION, INC.

Among the many changes which the war has brought about is a disposition on the part of manufacturers in various branches of industry to form combinations of individuals and firms so as to act collectively and to greater effect in matters affecting trade interests generally. This movement has embraced the chemical, iron and steel, pottery trades, etc., and now the rubber trade has come more or less into line by the incorporation of the above-

named association. It is limited by guarantee without any share capital and the membership is limited to 100, each liable for £1 in the event of winding up. Membership is confined to bona fide rubber manufacturers having their chief works in the United Kingdom. The first members of the Committee of Management are mainly those last elected to the committee of the late association, viz.: J. T. Goudie, Leyland & Birmingham Rubber Co., Leyland; Peter Bate, general manager, Castle Rubber Co., Warrington; P. A. Birley, Chas. Macintosh & Co., Inc., Manchester; F. H. C. Brooking, general manager, St. Helens Cable & Rubber Co., Warrington; Richard Eccles, general manager, F. Reddaway & Co., Manchester; James Henderson, Ancoats Vale Rubber Co., Inc., Manchester; David Moseley, David Mosely & Son, Inc., Manchester; James Tinto, Truell & Eastern Rubber Co., Inc., Manchester; F. Webster, Avon Rubber Co., Manchester.

A considerable accession of membership is reported during the last year or two and arrangements are being made to establish sectional committees in London and Glasgow. Among the many objects which the association has in view are the consideration of the terms and clauses in specifications issued by government departments and various public bodies; the encouragement of inventions likely to be of general utility to the trade; the encouragement of fresh sources of supply, of other necessary raw materials and the obtaining of adequate representation of the industry on trade boards.

WILKS BROTHERS WORKS ENLARGED.

Messrs. Wilks Brothers have almost completed the large extension to their premises at Booth street, Blackfriars, Manchester. Since the disastrous fire of 1913 the original premises were rebuilt with an additional story, but further extensions were subsequently necessitated. The firm manufactures waterproofs, rainproofs and oilskins, for the last of which the late S. Carter Bell had an agency in America where goods of this class do not seem to be so well known and popular as they are in Great Britain. Messrs. Wilks do a large business in motorcycle suits. In weatherproof cloth they have a specialty in their Aquarepel.

PERSONAL MENTION.

I record with regret the death of Colonel Herbert Hughes, of Sheffield, early in the year. The deceased, who was well known to a good many business people in America, was primarily connected with the steel trade but on the formation of the Xyler Rubber Co., Inc., of Manchester, four years ago he became one of the directors.

G. W. Leeson, who has been connected with the rubber heel manufacture in Manchester for some years, has now gone to London in connection with the Leeson Sponge & Rubber Co., Limited, of New Enterprise Works, Chiswick Road, London, W. Apropos of the rubber sponge I may say that retail prices of the American article have shown a sagging tendency, as general dealers are now competing with druggists in sales to the public.

William Somerville's Sons Rubber Co., Limited, is now the title of the Liverpool firm so long known in the reclaimed rubber trade as William Somerville's Sons. F. R. Burrows is the manager of the new company, having been associated with the business for many years. One does not hear anything of Mitchell's rubber nowadays, but those whose memory goes back 30 years or so when brands of reclaimed rubber were not so numerous in this country as they are to-day, will remember the time when Mitchell's rubber, as sold by Somerville's Sons, was a synonym for reclaimed rubber. Mr. Mitchell, of course, was an American who afterwards acquired an interest in Somerville's Sons.

A. Staines Manders, manager of the International Rubber and Allied Trades Exhibition, Limited, and Miss D. Fulton, secretary of the same corporation, are sending out a notice of the removal of their offices to Brownlow House, 51 High Holburn, London, W. C., which is also the headquarters of the Fulton-Manders Publishing Co., and the International Press Publicity Bureau.

THE RUBBER TRADE IN HOLLAND.

By a Special Correspondent.

THE Netherlands Overseas Trust has entered upon an agreement with rubber importers, which has caused great indignation among rubber manufacturers. By this agreement, the importers are to place at disposal for sale 300 tons of rubber, at 2.50 florins per half kilo [\$1.00 per 1.1 pounds], consisting of 75 per cent of prime and 25 per cent inferior qualities. The new regulation, ostensibly in the interests of manufacturers, further provides that the Trust shall decide whether applications are to be granted at all, the quantity to be allowed each applicant and the importer from whom rubber can be obtained. The whole quantity of rubber that has been allotted a certain manufacturer must be taken by February 1, 1918, and should delivery take place later, he will be charged interest at the rate of 5 per cent per annum and 50 cents per case per month warehouse fees and fire insurance premium.

The chief objections to this arrangement are that manufacturers are obliged to accept rubber which may or may not meet their requirements, the charges for storage and interest, and the high price of the rubber itself. To add to all this, the feeling exists that the measure was absolutely unnecessary, as manufacturers have never complained of any unwillingness on the part of the importers to release rubber for consumption.

A COURSE IN INDOLOGY.

What is expected to be of great benefit to the Dutch East Indies is the inauguration of a course in Indology by the board of directors of the Colonial Institute at Amsterdam. The object is to give suitable training for work, agricultural and otherwise, to those contemplating emigrating to the Dutch East Indies. The course will be held twice a year in Amsterdam, and the following subjects will be treated:

1. Essentials of the ethnology of the Indian Archipelago.
2. Introduction to the geography of the Dutch East Indies, with special regard to agriculture, mining, commerce and traffic.
3. Elements of the Malayan language.
4. Essentials of social conditions in the colonies.
5. The public institutions in the Dutch East Indies, with special regard to agrarian and labor laws.

In addition to these, quarterly courses will be given in:

- a. Tropical hygiene, diseases, personal hygiene and sanitation (especially on big plantations).
- b. Colonial products.
- c. If necessary, lectures on other colonial topics will be held.

It is expected that this course, which commenced March 2, will not only promote the actual knowledge of economic conditions in the colonies, but also a proper understanding, and thus better cooperation between the European and the Oriental in the Dutch Indies.

EMBARGO ON AUTOMOBILES.

The Netherlands Government has declared an embargo on automobiles. All shipping space has been requisitioned for foodstuffs and automobiles and other luxuries will not be accepted for shipment for some time.

DR. ITERSON RETIRES.

A royal decree to go into action November 1, has honorably discharged Dr. G. van Itersen, Jr., of the Technische Hoogeschool (Technical Academy), Delft, Holland, from his duties as director and supervisor of the Ryksvoorlichtingsdienst (Government's Information Service), in behalf of the rubber industry, and nominated him advisor to the same institution. Dr. A. van Rassun, now assistant, has been nominated director in his stead.

FIRST NETHERLANDS ANNUAL INDUSTRIAL FAIR.

On February 24, 1917, the official opening of the First Netherlands Annual Industrial Fair at Utrecht, took place, the Queen being the patroness. Of the 668 participants, 35 represented the leather and rubber industries. Owing to the war, there were no foreign visitors. Nevertheless, the enterprise has been declared a success and will be held in the spring of 1918.

INFANTS' NIPPLES IN FRANCE

The French law of April 6, 1910, prohibiting the sale and importation into France of certain tube feeding bottles has been extended so that it now also covers infants' "comforters" and nipples made of materials other than pure rubber, vulcanized by a process other than hot vulcanization, and not bearing, besides the manufacturers' or traders' mark, the special indication "caoutchouc pur."

AN EXCHANGE TO PROMOTE RUSSIAN-AMERICAN TRADE.

The newly established Russo-American Merchants and Manufacturers Exchange, Inc., with headquarters at 120 Broadway, New York City, aims to bring American producers and Russian consumers together, to familiarize each with the business methods of the other, and to establish a common ground for trade exchanges. The campaign among Russian consumers will take the form of a comprehensive directory of American industries in the Russian language, and which will be distributed throughout Russia to the number of 40,000 copies.

DENMARK PROHIBITS AUTOMOBILING.

The effect of the strict British censorship on all shipments of cars, gasoline and tires is being keenly felt in Denmark. Prices for gasoline are four to six times as high as in the United States, while few tires reach there. Under these circumstances, the Danish Government has thought it advisable to prohibit temporarily the use of passenger cars on the streets.

GERMANY WANTS BRAZILIAN RUBBER.

It would appear that Germany's difficulties in obtaining rubber will not be greatly diminished after the war. True, she intends to establish a rubber market for Central Europe at Hamburg when peace is restored. But, for a time, at least, she will hardly be able to import rubber from the British colonies, and Brazilian exporters are of opinion that a rubber market must be created in France. They think it absolutely necessary to establish in France a free port and a banking organization capable of freeing the Brazilian exporter and the French consumer from the monopoly exercised by the port of Hamburg until 1914.

CORKS FOR BICYCLE TIRES IN GERMANY.

Meanwhile, German ingenuity is being taxed to the utmost to find means by which the deficiency in rubber articles can be supplied, and experiments are being made with all kinds of substitutes.

According to the German paper, bicycles have become almost extinct in Germany since the seizure of rubber tires. Corks from wine bottles provide a substitute, however, about 100 being needed for both wheels at a cost of 2 to 3 marks. The corks should be of equal breadth, not tapering sharply, four to five centimeters long and about 23 thick. They are pressed tightly together and cemented to the rims of the wheels. Cork is very elastic, and although it has not the resilience of rubber, especially on rough pavements, when traveling on good roads it is quite satisfactory.

RUBBER MACHINERY DUTY FREE IN CEYLON.

A recent change in the tariff laws of Ceylon exempts from duty machinery intended for use in the manufacture of articles from crude rubber.

BRITISH INDIA.

The new tariff (No. 121) on rubber tires for motors and motorcycles, and rubber tubes for tires and other manufactures of rubber, not otherwise specified, is now 7½ per cent ad valorem.

Welfare work is on the increase in the Far East. The Bandar Rubber Co., of Sumatra, has appropriated a goodly sum for a vacation beach resort on Toba Lake for the benefit of its employees.

RUBBER TRADE IN HANKOW, CHINA.

HANKOW is an important city in northeast China, from which are exported hides, skins, silk, tea, cotton, nuts and other products of the soil. There are about 70 firms which do an export and import business. The following information, of interest to rubber manufacturers, is furnished THE INDIA RUBBER WORLD by Edwin S. Cunningham, Consul General, at that city:

At the present time rubber belting in 1 inch to 6 inch widths, rubber hose in 1 inch to 2½ inches diameters for steam and water fittings, and rubber packing in sheet form are the chief rubber articles imported into this district. The various jinrikisha firms also handle rubber tires, and some small amounts of rubber goods are carried in stock by the local motor car and accessory dealers and by the drug and druggists' supply houses.

According to statistics issued by the Chinese Maritime Customs, rubber and rubber goods were imported into Hankow to the value of \$7,918 (gold) during 1914; \$19,263 during 1915, and \$11,276 during 1916. Japan furnishes the bulk of these goods, with Russia second, Great Britain third, France fourth, Hongkong fifth, and the United States sixth. Tientsin acts as the chief market in China for rubber goods, with Manchouli second, Shanghai third, Dairen fourth, and Hankow fifth.

Rubber belting is not included in the above figures, as it is classed with the other varieties of belting. According to the Custom House statistics there was 93,460 tael [£77,412 U. S. currency] worth of machine belting imported into Hankow during 1916, of which, according to the commissioner, 80 per cent is of leather. The bulk of the remaining 20 per cent is made up of rubber and woven belting, but in what proportions I am unable to say.

Local dealers report that due to the climate of Hankow, which has a very deleterious effect on rubber articles, they prefer to buy their goods from Shanghai distributors and thus avoid the risk of keeping large stocks on hand which might be spoiled by the weather.

In consequence it would appear that the greatest opportunity for supplying the rubber market of this district lies in forming connections with some of the large importing houses of Shanghai, as that port acts as the chief distributing point for practically all of central China.

It might be advantageous for manufacturers of rubber goods desirous of entering this market to communicate directly with the various Hankow firms handling rubber goods, in which case the following list of local dealers will be found valuable for reference. To avoid repetition, American addresses are given in the numbered footnotes below:

BELTING. Anderson, Meyer & Co., Limited¹; Burtenshaw & Co.; A. Brandt & Co.; Carlowitz & Co.²; H. Deiderichsen & Co.³; Robert Dollar Co.⁴; Lothar, Marcks & Bush⁵; New Engine & Iron Works; F. Schwartzkopf & Co.; Westphal, King & Ramsay, Limited⁶; Chinese American Co.⁷; Neilsen & Winter China Engineering Co.

HOSE AND FITTINGS. Anderson, Meyer & Co., Limited¹; Burtenshaw & Co.; A. Brandt & Co.; Carlowitz & Co.²; H. Deiderichsen & Co.³; F. Schwartzkopf & Co.; Telge & Schroeter⁷; Neilsen & Winter China Engineering Co.

TIRES AND ACCESSORIES. (See also Jinrikishas, below). Arnhold, Karberg & Co.⁸; A. Brandt & Co.; H. Deiderichsen & Co.³; New Engine & Iron Works; F. Schwartzkopf & Co.; Weeks & Co.⁹; L. S. Wureh & Co.; Central Garage Co., Limited.

JINRIKISHA DEALERS. Star Rickshaw Co.; F. Ramello; Hankow Rickshaw Syndicate; Fook Kee & Co.; Tong Chong Bicycle Co.

GENERAL RUBBER GOODS AND SUPPLIES. Arnhold, Karberg & Co.⁸; Hankow Dispensary, Limited⁹; New Engine & Iron Works; Pharmacie Centrale; F. Schwartzkopf & Co.; L. S. Wureh & Co.; Chinese American Co.⁷.

American representatives or agents of these firms are:

- 1—Pacific Commercial Co., 50 Broad street, New York City.
- 2—Carlowitz & Co., 82 Beaver street, New York City.
- 3—Crossman & Snelke, 90 Wall street, New York City.
- 4—Robert Dollar Co., 230 California street, San Francisco, California.
- 5—Irwin, Harrison & Crossfield, 90 Wall street, and G. Amsinck & Co., Hanover street, New York City.
- 6—Chinese American Co., 200 Devonshire street, Boston, Massachusetts.
- 7—H. Marquardt & Co., 35 South William street, New York City.
- 8—F. H. Erlinger, 60 Wall street, New York City.
- 9—Muller, McLean & Co., 11 Broadway, New York City.

* This firm imports only for its own needs in the sawmill business.

While these firms are all of good repute, the writer can accept no responsibility for them in any way. They can, do doubt, furnish references, and information as to their credit standing can be obtained from the local banks upon application by your bankers. Correspondence with them may be in English irrespective of their nationality.

THE SITUATION IN JAPAN.

By a Special Correspondent.

THE demand for rubber goods in Japan and Far East localities supplied by Japan is increasing rapidly. Such representative men as Chugo Moriya, a large dealer in general rubber goods, and Yoshio Kawashima, manager of the Oriental Rubber Cloth Co., agree that the demand in 1915 was fully double that in 1914. This was particularly true of electrical goods, jar rings, packing, air-cushions and raincoats. The latter were more of cotton costing about \$7.50 and less of silk than formerly, due perhaps to economies on account of the war. Exports to China and the South Sea islands showed a big increase.

RESTRICTIONS ON RUBBER EXPORTS.

Crude rubber and manufactured rubber goods imported from England and her colonies or elsewhere may not be exported from Japan except upon agreement with the British authorities. However, German agents in China, desiring to export such materials to neutral countries, found it convenient to ship them to our ports and place them in a bonded warehouse until a sailing to the desired port occurred. On January 27, however, a ruling of the Department of Agriculture and Commerce brought such goods into the prohibited list and presumably stopped this traffic. Unless the principle dictating the change be rigidly enforced, however, to prevent transfers in the offing or even on the pier but outside bonded warehouses, the efficacy of the new ruling is doubtful.

Although the Russian Government has purchased large quantities of rubber tires of Japanese manufacturers, the larger business in rubber toys and druggists' sundries has been lost through the Russian prohibition of all imports of luxury during the war.

RUBBER TOYS.

Japan has long been a great producer of toys, and it is not surprising that some of our rubber manufacturers should seek an outlet for their goods through similar channels. In the manufacture and sale of colored toy balloons Sadakichi Okuda, of Asakusa, takes the lead under the firm name of Sawadaya. Much of his product is sold abroad, the exports for March alone totaling 34,000 balloons valued at over \$7,500. In Tokyo his wares are sold by street venders, toward whom he has shown great benevolence. As he is said to be worth \$1,000,000, it has been possible for him to supply balloons to these poor men on extended credit which has enabled many of them to make a substantial start in mercantile life.

One of our leading manufacturers of rubber toys has recently placed on the market a novel globe bouncing ball with the various countries molded upon its surface. This, it is thought, will be pleasing as a plaything and instructive in geography as well.

JAPANESE PLANTATIONS IN MALAYA.

A noticeably better feeling is being manifested toward the Japanese in Malaya than hitherto. Those who first settled there, unfortunately, uneducated and without means, were held in contempt by both natives and white men, and it is not surprising that a like antipathy was felt toward the better classes of their countrymen who followed later. Government officials were regarded with suspicion, but when it was realized that legitimate business and not territorial ambition was the Japanese aim, and when our enterprise and progressiveness were observed, a friendly feeling began to develop which will make it possible for Japanese and British planters to cooperate for the good of the industry.

Since Mr. Akuzawa bought 300 acres on the Malay Peninsula in Johore in 1905, at a cost of \$100,000, Japanese planting interests have grown until now the invested capital aggregates \$7,000,000. Of the leased area, amounting to 110,000 acres, 50,000 acres are now planted and the 1916 production of rubber reached 2,230,000

pounds. The planted area is constantly increasing and will soon become 60,000 to 70,000 acres. Several plantations located on the west side of the Nafu River, about 80 miles from Singapore, are just reaching the tapping age. About 400 Japanese and 5,000 Chinese coolies are employed in this region.

An association of Japanese planters has been organized with a governing committee of 40 members representing each estate. Aside from activities directed toward expansion and general development, particular attention is being devoted to sanitary conditions and a well-equipped hospital on every estate. Cooperation, wherever possible, with British, Dutch and Chinese interests is one of the chief aims.

Our advantages as a people in rubber planting seem to outweigh our disadvantages. Of the former may be mentioned our ready adaptability to agricultural organization; the low cost of administration; our dependence upon rice as a principal food, which grows well, in the East Indies; the fact that we endure the tropical climate with ease, and that our Chinese and other laborers, being of similar race, trust us, despite slight differences in religion, manners and customs, so that superintendents and laborers work harmoniously together.

Our disadvantages lie in high interest charges on capital; the desire for quick successes and a tendency to be satisfied with small earnings; the absence of well-organized experimental and research work looking toward improved methods and product, and the lack of business combination and cooperative effort. Thus there is still much opportunity for constructive work for the common good of the industry.

RUBBER COMPANIES PROSPEROUS.

Toyoyino Miyake, of the Nippon Rubber Co., reports a greatly increased business during 1915 in belts, balls and particularly automobile tires from the factory which was enlarged in September, 1915. The gross proceeds were over \$146,500 and the profits \$28,750, which were somewhat affected by the rising cost of raw materials. Medium quality tires of 26- and 28-inch size were in great demand. Balls were chiefly exported to China and Argentina. Some dolls were made, but only to special order.

The Settsu Rubber Co. earned profits of \$5,181 for the past year.

The profits of the Chiyada Rubber Co., of Tokyo, were \$11,347.

For the last six months of last year the Takasago Rubber Co. reported profits of \$2,538.

TRADE NOTES.

On the 43,200 square feet of land recently purchased, the Kakuichi Rubber Co. is now erecting an extension to its former factory which will cover 25,200 square feet. Machinery and general equipment will be modern in every respect.

The Teikoku Rubber Co. has been reorganized as a joint stock company with a capital stock of \$75,000 and will erect a new factory.

The Miyagawa Rubber Store has opened a foreign trade department at 34 Nichome, Yamatedon, Kobe, which will continue the export business of the firm and also engage in the importation of crude rubber, chemicals and other raw materials.

The Alenken Rubber Factory has purchased 14,400 feet of land adjoining its present site for immediate extension of the plant.

The building of the Kanae Packing Manufacturing Co. is nearly ready for occupancy at 601 Kitsu, Jomammamura, a suburb of Osaka. The output will consist of asbestos material, packing and rubber goods. Of the \$250,000 capital stock, \$62,500 has been paid in.

One of the leading spirits in the development of the Japanese rubber industry is Kenjiro Tsuji, managing director of the Chiyoda Rubber Co., who is bending his energies not only to his own firm's welfare, but to the rubber interests of the whole country as well.

The rubber industry of Osaka now comprises 58 factories em-

playing 416 men and 355 women. Both the Hirando Rubber Manufacturing Co. and the Ogata Rubber Store, of Osaka, have recently completed additions to their factories. The latter includes the best modern equipment for the manufacture of over-shoes and rubber heels.

Several new stockholders have increased the working capital of the Taiheigo Rubber Co. to \$6,000.

At the general meeting of the Asaki Rubber Co., a \$150,000 plantation firm, it was announced that its trees, valued at about \$116,000, are about to come into bearing.

A rubber horseshoe said to have three times the durability of an iron horseshoe has been patented by Gentaro Yameguchi.

The Taigo Rubber Co., 17 Kayabadio, Honjoku, has been re-organized with a capital of \$50,000 for manufacturing and selling rubber goods.

TAPPING METHODS.

AN interesting article, contributed by F. M. Riley to the "Planters' Chronicle," explains the various tapping methods employed by planters in Malaysia. He enumerates the four now employed on European-managed estates as follows:

- A. Basal V.
- B. One cut one quarter
- C. Two cuts one quarter (same quarter)
- D. One third

The first mentioned (A) Basal V, is mostly employed on newly opening up, where a fairly large return per acre is desired.

(B). The one cut one quarter is chiefly employed on old trees, say 10 or 12 years old, where the preservation of the bark has become of vital importance.

DAILY TAPPING RECOMMENDED FOR ONE QUARTER CUTS.

(C). Two cuts one quarter (same quarter) are used when the tapping in the past has not been so drastic and the conservation of the bark not of such vital importance. Generally on old trees, the cuts can be 2 feet to 2 feet 6 inches apart, according to size of the trees. Alternate day tapping is strongly advised for this system.

THE ONE-THIRD METHOD CONSIDERED BEST.

(D). This, the one-third method, is the last referred to, and is considered the most important of all. It is a comparatively new practice and has stood all tests well. Under this system the amount of bark consumed is 17 per cent less than the Basal V, while the amount of latex differs only slightly, on some estates practically not at all, and on others not more than 10 per cent less. The exception is on young trees, and this is an advantage, as the Basal V for young trees is considered too severe a treatment, removing too much latex. It is possible that the one-third method may be adopted on the system of daily tapping, and come into general use both for old and young trees.

Great differences in estates are noted, especially in respect to soil, moisture, etc., and those exposed to the sea air are reported as not giving such good results as those located inland.

TAPPING KNIVES.

Regarding tapping knives it appears several kinds are in use and recommended, but the great art of good tapping is a sharp knife, and most coolies take two knives with them to the field, cutting half the job with one, and half with the other, the knives being resharpened at night by a professional, who gets about 50 cents per man per month, this being paid by the coolies.

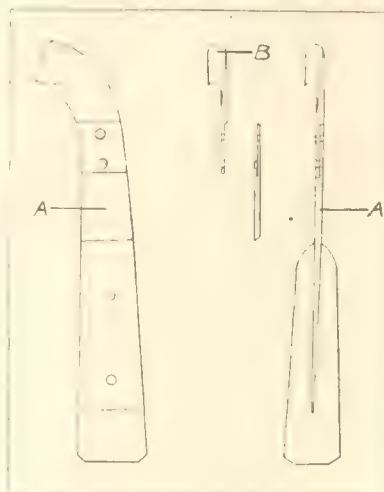
This applies only to the Chinese, however, who are better paid than the Tamils. The latter sharpen their own knives. One of the duties of the assistant should be to test the coolies' knives at least 2 or 3 times weekly.

PERUVIAN EXPORT DUTIES.

The Peruvian government has imposed a duty of 2 centavos per kilogram of rubber exported through Iquitos, and a tax of 20 centavos per registered ton on ships clearing from that port.

NOVEL TAPPING KNIFE AND LATEX SPOUT.

THE tapping knife here shown presents many practical features of construction, and the fact that it has been in use for some



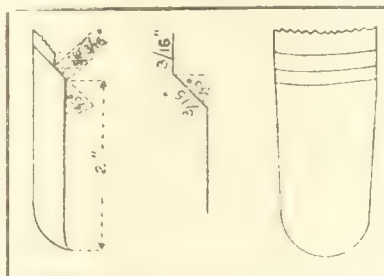
time on a large estate in the Far East lends interest to the device. A simple, fool-proof knife has been the object of tapping tool inventors, who have consistently endeavored to improve this most necessary plantation accessory.

As the cutting edge wears away in a comparatively short time, a replaceable, one-piece blade is necessary, and one that may not be loosened and its position changed at will by the

tapper. Referring to the drawings the fixed blade A is provided with a dowel pin, and a rivet hole at its upper end is attached to an ordinary wooden or metal handle. The loose blade B has two holes at its lower end for the dowel pin and rivet, by which it is attached to the fixed blade. The head of this rivet must be filed off when it becomes necessary to attach a new blade. The handle should, with ordinary use, outwear four or five blades.

AN IMPROVED SPOUT.

The ordinary latex spout is usually defective in that it may be driven too far into the tree, thereby causing a woody excrescence when the wound heals over. The spout here shown is constructed



with a shoulder that prevents this difficulty. The shoulder slopes downward at an angle of 45 degrees and has a depth of 3/16 of an inch. It is desirable that the end of the spout should be curved, and the correct depth should depend on the diameter of the tree,

the angle at which it is placed and the general curve of the spout. When the depth of the attaching end curve is correct it will always enter the bark at the same depth and remain firmly in a correct position.

The tapping tool was designed by A. Bailey and the latex spout by Donald Knapp, both of the General Rubber Company, Sumatra.

LEAF-FALL INVESTIGATION IN MALANG.

Investigations to discover the causes of abnormal leaf fall from *Hevea* trees have been made at the experiment station at Malang, but with no very definite results. In most cases heavy rains prevailed just before such leaf fall occurred. In some instances parasitic fungi have been found on the leaves. In Malang the fungus *Neozimmermannia elasticae* Kds. (*Gloeosporium elasticae* Massee) has been found in two cases of abnormal fall of young leaves, but artificial infection with pure cultures of this fungus has thus far given no definite result.

Dr. Arens advises that fallen leaves should be gathered at once and burned on the spot. If possible the affected trees and those nearby should be treated with fungicide. Trees thus treated should not be tapped, as they might produce tacky rubber because of the use of the fungicide.

Rubber Planting Notes.

RUBBER PRODUCTION IN SOUTH INDIA.

ACCORDING to Lucien Memminger, American Consul at Madras, India, the ten principal rubber plantations of South India produced over 3½ million pounds of rubber last year. A study of the detailed report showing the crops harvested in 1915 and 1916, and the estimates for 1916, indicates that in each case the 1916 yield was considerably above that of 1915; that on most estates the estimate has been considerably exceeded; that the Rani Travancore Co., which up to the end of 1915 was the largest rubber producing company in Southern India has now been displaced by the Malayalam Rubber Produce Co. With prices nearly approaching the average of 1915 and lower costs of production in most cases, some very substantial dividends may be expected. In this respect so far the Pudukad and Cochin companies are leading with interim dividends aggregating 40 per cent and 30 per cent, respectively.

RUBBER PLANTING IN SIAM.

Up to the present the rubber exports from Siam have not been very significant. On the only rubber plantation of importance in southern Siam 25,000 trees were planted about 6 years ago. Of these 20,000 are now ready for tapping. Considerable quantities of rubber are said to come from northern Siam, however. In the districts of Trang and Setul, Siamese Malay States, some attention is being given to rubber planting, but as far as can be ascertained, the production has, until now, been of little importance.

WEEKLY AUCTIONS AT MEDAN.

The Medan Produce Trade Association has decided to arrange to hold rubber auction sales weekly, instead of fortnightly, as is now the case. These sales may be private or public, according to the wishes of the sellers. Only members of the association will be permitted to take part in these sales, whether public or private.

A DEFECT COMMON IN SHEET RUBBER.

Sheet rubber frequently shows a dark line near and parallel to the edges. The cause of this has been investigated by Dr. P. Arens, who explains the cause as follows:

The cause of this line is a very simple one. The strength of the rubber, coagulated in the pans, is not the same in every part. The surface, which is exposed to the air, especially near the edges, is somewhat stronger than the rest.

When the sheet is rolled and insufficient precautions taken, this surface is less stretched than the other parts of the coagulum, with the result that the latter protrudes beyond the original margin of the sheet. This original margin retains its position a certain distance inside the newly formed edge and, since it was the hardest part of the coagulated mass, it is not so compressible as the rest and therefore forms a distinct ridge.

To avoid this, certain measures have to be taken, when putting the sheet through the rollers. The sheet must pass through the rollers in the same position it had in the coagulating pan, *i. e.*, the upper surface in the latter kept uppermost when put in the rollers. The sheet should be gripped by the rollers in the middle of the small side first, so that the edges pass through the rollers somewhat later than the middle. The edges must be turned down a little, whilst the sheet is passing through the rollers. If this is done, the margin of the sheet, hardened in the coagulating pan, will also form the margin of the sheet after rolling, and therefore no prominent line will be visible.

It is advisable not to fill the pans too full, as the prominent line will be more easily formed on a thick sheet than on a thin one.

A good material on which to train the coolies for this work is sheets the surface of which is darkened by oxidation in the coagulating pans. If these sheets are rolled in the proper manner, no white margin should be visible after rolling.

BELGIAN CONGO PROSPEROUS.

Despite the conditions imposed by the war, Belgian Congo prospers. The Governor General of the colony is reported to have said that the revenue is expected to show a surplus of 8,000,000 francs over the estimates in the current budget.

The figures for the rubber exports show a slight decline, 4,428,945 pounds in 1915 as against 4,892,166 pounds in 1914, but the increase in the price of rubber is again drawing the attention of buyers to the Congo product, the value of which had depreciated in 1914.

INCREASES IN THE GOLD COAST TRADE.

Figures for the trade of the Gold Coast show a decided increase, not so much in the quantities imported and exported, as in the values. The imports for the year 1915 amounted to £3,116,686, that is, 1 per cent less than in 1914, while the exports for 1915 were £5,814,810, or 30 per cent more than in 1914. The increased prices in all goods are largely responsible for these high figures and the profits are said to have been enormous.

The exports of rubber for 1915 were 647,982 pounds, valued at £25,167, as against 654,133 pounds valued at £21,631 in 1914, furnish a very fair illustration of the truth of the above.

GERMAN EAST AFRICA REOPENED FOR FOREIGN COMMERCE.

Communication with German East Africa is being gradually reestablished. The British Postmaster General has also announced the establishment of a parcel post service to the southern portion of German East Africa. All ships engaged in foreign commerce must clear at either Tanga or Dar-es-Salaam, on license of the British customs authorities.

PLANTATION RUBBER IN BRITISH GUIANA.

The Department of Science and Agriculture reports the area of rubber under cultivation for the year 1915 as being 4,687 acres, a decrease of 275 acres as compared with returns for 1914. This is due to the throwing out of areas planted with sapium rubber, as well as the abandonment of some small areas of Para rubber, the soils having proved unsuited for its cultivation.

Experimental tapping was continued at the Issorora and Onderneeming stations and for part of the year at Christianburg.

At Issorora the crop for the 12 months ending January, 1916, was 1,000 pounds of dry rubber (854 pounds biscuit and 146 pounds of other grades), obtained from 428 trees of from 5 to 7 years old, an average of over 2¼ pounds of dry rubber per tree.

In one experiment 300 trees, tapped by a man and a boy, yielded 873 pounds of dry rubber, which cost \$58.40 to collect, or less than 7 cents per pound. Most of the produce was sold in London in February, 1916, at a price of 81 cents per pound for biscuit and 68 cents per pound for scrap and other lower grades.

The latex of the other 128 trees was mainly used for the preparation of "ball" rubber by smoked coagulation, similar to the Brazilian method.

At Onderneeming the crop was 310 pounds of dry rubber (257 pounds biscuit and 53 pounds scrap, etc.). Part of this was sold in February, 1916, at 81 cents for biscuit and 68 cents for scrap.

At Christianburg 128 trees were tapped. One year's tapping yielded 201 pounds of dry rubber (161 pounds biscuit and 40 pounds scrap, etc.). A part sold in September, 1915, brought 56 cents per pound; the remainder realized in February, 1916, 81 cents for biscuit and 58 cents for scrap.

The results obtained at the experiment stations were, therefore, highly satisfactory. The same is said of the returns for 1916; the yields from the trees are very good and brought the highest prices.

Recent Patents Relating to Rubber.

THE UNITED STATES.

ISSUED MARCH 27, 1917.

- N** 1,219,502. Water bag. E. J. Straus, St. Louis, Mo.
 1,219,577. Rubber patch for pneumatic tires. J. G. Moomy, Erie, Pa.
 1,219,653. Tire plug. E. L. McLeod, Leland, Ill.
 1,219,675. Tire plug. O. S. Scholck, Peoria, Ill.
 1,219,729. Automatic tire valve. G. T. Hackley, administratrix of said G. T. Hackley, deceased, Calif.
 1,219,798. Tire gage. O. H. Barthelme, assignor to I. Halbrohr—both of Peoria, Ill.
 1,219,865. Tire gage. A. E. Pollock, Chicago, Ill.
 1,219,925. Automatic tire valve. F. A. Dean and W. H. Little, Alta Vista, Kans.
 1,219,948. Rim tool. G. A. E. Kaehler, Fresno, Calif.
 1,219,991. Rubber heel. F. A. Nolan, St. Paul, Minn.
 1,220,004. Collapsible rim. F. Rogers, Galveston, Tex.
 1,220,006. Closure for rubber receptacles. T. Rowe, Leytonstone, England.
 1,220,107. Tire tool. A. C. Hartman, Dillsburg, Pa.

ISSUED MARCH 27, 1917.

- 1,220,172. Teat cup. A. L. Berthelsen, Chicago, Ill.
 1,220,272. Tire gage. A. F. Pollock, assignor to Firex Manufacturing Co.—both of Chicago, Ill.
 1,220,282. Eraser. J. C. Smith, Kansas City, Mo.
 1,220,321. Device for expanding and contracting demountable rims. C. F. Corbett, Clear Springs, Md.
 1,220,372. Waterproof elastic fabric. A. C. Squires, assignor of one-half to John E. Wainwright—both of College Point, N. Y.
 1,220,471. Demountable rim. F. Spranger and N. M. Spranger, assignors to Spranger Rim and Wheel Co., a corporation of Detroit—all of Detroit, Mich.
 1,220,516. Segmental vehicle-tire. P. E. King and G. J. Wittmann—both of Newburgh, N. Y.
 1,220,541. Demountable rim. A. J. Park, Madison, Wis.
 1,220,568. Inner tube protector for pneumatic tires. G. Statke, New York City.
 1,220,603. Storage battery construction comprising a hard rubber part. D. J. Cartwright, South Bethlehem, Pa.
 1,220,625. Life-saving suit. J. Grudziński, Toledo, Ohio.
 1,220,653. Auto tire. G. Loffi, assignor of forty-five one-hundredths to F. E. Fluke—both of Garrett, Ind.
 1,220,659. Tire tool. C. B. Mansbach, assignor of one-third to F. L. Price, and one-third to F. A. Carlson—all of Brockton, Mass.
 1,220,660. Composite heel. C. B. Mansbach, assignor of one-half to F. L. Price—both of Brockton, Mass.
 1,220,661. Fire hose. R. Many, Oak Park, Ill.
 1,220,724. Vahana and support. A. A. S. Burns, Montreal, Quebec, Canada.
 1,220,750. Sunshade for pneumatic tires. R. C. Jeboult, Edmonds, British Columbia, Canada.
 1,220,809. Dust cap for valve stems. E. L. Aitken, Springfield, Mass.
 1,220,819. Tire patch clamp. H. Brethauer, New York City.
 1,220,867. Pressure indicator for tires. Lauchlin McInnis and David B. Semon—both of St. Paul, N. C.
 1,220,874. Toy balloon. T. W. Miller, assignor to The Faultless Rubber Co.—both of Ashland, Ohio.
 1,220,875. Fountain pen. M. W. Moore, Somerville, assignor to Samuel Ward Manufacturing Co., Boston—both in Massachusetts.
 1,220,914. Puncture proof pneumatic tire. R. Wapshare, Westward Ho, Bangalur, British India.
 1,220,925. Hose supporter. Ann E. Zabriskie, New York City.
 1,220,934. Pneumatic or elastic wheel tire. G. W. Beldam, Ealing, and A. U. B. Ryall, Brentford—both in England.
 1,220,956. Tire tool. P. W. Coffman, New Salem, Pa.

ISSUED APRIL 3, 1917.

- 1,221,060. Closet seat comprising a veneer of hard vulcanized rubber. E. C. B. Judd, assignor to The Brunswick-Balke-Collender Co.—both of Chicago, Ill.
 1,221,084. Syringe. W. J. Norris, McCloud, Okla.
 1,221,100. Envelope for inner tubes. C. F. Smith, Brighton, and C. A. White, Somerville, Mass.
 1,221,181. Game table with elastic cover. R. G. Hooper, Delaware, Ohio.
 1,221,246. Respirator. C. Travers, Frankenholz, near Mittelbexbach, Germany.
 1,221,335. Vacuum nursing bottle and nipple therefor. J. N. Kline, Washington, D. C.
 1,221,387. Respirator. J. A. Ste. Marie, Laprairie, Quebec, Canada.
 1,221,446. Physician's mask. H. A. Hecht, Paterson, N. J.
 1,221,473. Bathing cap. J. Riley, Jordon, Minn., assignor of forty-nine one-hundredths to Sarah Abrams, San Francisco, Calif.
 1,221,479. Tire plug. R. W. Sampson, Whitestone, N. Y., assignor of one-half to L. Schwab, East Orange, N. J.

- 1,221,489. Elastic webbing. A. Turner, Leicester, England.
 1,221,518. Flexible rubber surgical appliance. H. A. Dygert, Philadelphia, Pa.
 1,221,721. Pneumatic tire carrying vehicle wheel. E. Gasper, Grass Valley, Calif.
 1,221,759. Pneumatic tire. J. B. Lynch, Syracuse, N. Y.

ISSUED APRIL 10, 1917.

- 1,221,832. Convertible and inflatable life belt. A. Gerley, Buenos Aires, Argentina.
 1,221,887. Making four-ply lock cord tires. R. M. Merriman, Akron, Ohio.
 1,221,888. Four-ply lock cord tire. R. M. Merriman, Akron, Ohio.
 1,221,912. Tire plug. R. W. Sampson, Whitestone, N. Y., assignor of one-half to L. Schwab, East Orange, N. J.
 1,221,978. Tire protector. H. R. Decker, Houston, Tex.
 1,222,070. Shoe for tires. W. L. Christian and P. Barker—both of Los Angeles, Calif.
 1,222,114. Surf diving and skimming device. J. P. McCarty and F. W. Falck; said Falck assignor to R. G. Matzene—all of Los Angeles, Calif.
 1,222,190. Recoil pad for fire arms. W. F. Dimelow, New York City.
 1,222,211. Tire fastening device. F. P. Johnson, Danville, Pa.
 1,222,283. Vehicle tire. M. Gray and B. Harris—both of New York City.
 1,222,291. Recoil rubber pads for firearms. S. A. Huntley, assignor to The Huntley Manufacturing Co.—both of Omaha, Nebr.
 1,222,467. Garter. L. L. Rogers, Boston, Mass., assignor to E. C. Moore, New York City.
 1,224,494. Bust developer. J. T. Thomas, Clarinda, Iowa.
 1,222,508. Life saving vest. M. Zawada, Cleveland, Ohio.
 1,222,542. Demountable rim. J. W. Drummond, Chillicothe, Ohio.
 1,222,555. Fountain pen. A. P. McArthur, Chicago, Ill.
 1,222,563. Ground mat. N. Rosenberg, assignor of one-half to C. Schaefer—both of Chicago, Ill.

THE UNITED KINGDOM.
PATENT SPECIFICATIONS PUBLISHED.

In order to give the public the advantage of having abridgments of specifications up to date while retaining their numerical sequence, applications for patents made subsequent to 1915 are given new numbers when their complete specifications are accepted, or become open to public inspection before acceptance. The new numbers start with No. 100,001 (without any indication of date), and supersede the original application numbers in all proceedings after acceptance of the complete specifications.

ISSUED MARCH 7, 1917.

- 15,770 (1915). Corsets and abdominal belts having elastic sections. F. G. Baugatz, 37 Boulevard des Capucines, Paris.
 15,844 (1915). Inner tubes. C. H. Max, 37 Prospect Road, Moseley, Birmingham.
 15,860 (1915). Safety harness for aviators consisting of a belt of elastic webbing. H. L. Short, A. E. Short, and H. O. Short—all of 56 Prince of Wales Mansions, Queens Road, Battersea Park, London.
 15,881 (1915). Protected pneumatic tire. J. A. Andrews, St. Margaret's Hotel, Osborn Road, Jesmond, Newcastle-on-Tyne.
 15,904 (1915). Sleeve for insertion between tire tube and cover. W. C. Sneyd, 144 Broad street, Pendleton, and H. E. Young, 32 Broadway, Withington—both in Manchester.
 15,959 (1915). Demountable rim. Standard Welding Co., West 76th street, assignees of R. S. Bryant, The New Amsterdam, cor. of Euclid avenue and East 22nd street—both of Cleveland, Ohio, U. S. A.
 15,962 (1915). Wading boot. R. D. Carson, 1 Victoria street, Newton Stewart—both of Wigtownshire.
 16,002 (1915). Pneumatic tire tread. R. G. Wooten, 141 Walmer Road, Toronto, Canada.
 16,046 (1915). Sock-suspenders. R. K. Guinzburg, 725 Broadway, New York City, U. S. A.
 103,077. Detachable rim. W. E. Copithorn, 49 North Main street, Natick, Massachusetts, U. S. A.
 103,081. Solid rubber tire. G. A. Mortier, 5 Hall Road, Fulwood, Preston, Lancashire.
 103,100. Life-saving device. C. Thomas, 33 Tynnycoed Terrace, Thomastown, Tynnyfail, Glamorganshire.

ISSUED MARCH 14, 1917.

- 16,126 (1915). Leggings made of waterproof material. G. G. Smith, 89 Kensington avenue, Manor Park, London.
 16,193 (1915). Nipples for nursing bottles. F. C. Jones, 24 Belvedere Road, Upper Norwood, London.
 16,219 (1915). Tire valves. R. S. Burn, The Poplars, Wylde Green, Birmingham.
 16,264 (1915). Club or cane having a core of wire and a body part of rubber. E. E. Weflen, 5 Gruners Gate, Christiania.
 16,282 (1915). Rubber or balata driving belts. A. Carlsen, 1 Badstuestraede, Copenhagen.
 16,326 (1915). Rubber tip for crutches. C. Douglas, 303 Waterloo street, Oldham.

- 103,171. Tubeless pneumatic tire. C. V. Bays, 66 Victoria street, Westminster.
 103,187. Pot for disinfecting dental and surgical instruments, provided with a rubber pad. F. G. Monlaunt, 49 Clarkgrove Road, Sheffield.
 103,256. Detachable rim. C. L. Kennedy, 1305 Ingraham street, Los Angeles, California, U. S. A.

ISSUED MARCH 21, 1917.

- 16,426 (1915). Wheel tires. J. Taylor, 15 Lord Byron street, Eccles New Road, Salford, Lancashire.
 16,517 (1915). Rubber fly swatter. G. W. Gomber, Conyngham, Pennsylvania, U. S. A.
 16,503 (1915). Rubber or gutta percha combined with leather in shoe soles. H. E. G. Bateman, 18 The Western Broadway, King street, Hammersmith, and J. T. Barkwith, 10 Bramber Road, West Kensington—both in London.
 16,539 (1915). Wheel in which annular rubber cushions are secured between and to the sides of the spoke ring and flanges on the axle box. A. E. Russell, 77 Henry street, Windsor, and W. G. Charley, 454 Collins street—both in Victoria, Australia.
 16,579 (1915). Combination cushion and pneumatic tire. R. Blakoe, 62A Queen's Road, Bayswater, London.
 16,589 (1915). Fountain pens. L. E. Waterman & Co., 173 Broadway, New York City, assignees of E. F. Britten, 21 Van Reipen avenue, Jersey City, New Jersey, U. S. A.
 16,612 (1915). Convertible waterproof covers. W. B. Robeson, Port Huron, Michigan, U. S. A.
 16,665 (1915). Reservoir pens. C. Bristow, The Chestnuts, Brockley View, Forest Hill, London.
 16,676 (1915). A trench boot or wader. J. S. Kruse, Regent Palace Hotel, Piccadilly Circus, London.
 16,750 (1915). Rubber-covered artificial feet. G. Hardman, "Belmont," Audenshaw Road, Audenshaw, Manchester.
 103,304. Pneumatic tire casing. P. Nivet and J. B. Haegy, Luxé (Charente), France.
 103,335. Diaphragms with vulcanite attachments for telephones. T. Chalmers, 81 Underwood Lane, West street, Crewe, Cheshire.
 103,348. Tire formed of alternate layers of plain and spongy rubber enclosed within a plain rubber cover. A. A. Crozier, 3 Woodquest avenue, Herne Hill, London.

ISSUED MARCH 28, 1917.

- 16,841 (1915). Respirator with rubber bands for attaching to wearer's head. F. Morris, "Lea Hurst," Willows avenue, Lytham, Lancashire.
 16,849 (1915). Diving suit. Neufeldt & Kuhnle, Werk Ravensberg am Habsburger Ring, Kiel, Germany.
 16,851 (1915). Crutches having inflated tubes in arm pads and foot. J. C. Roberts, Mercantile Bank of India, 15 Gracechurch street, London.
 16,900 (1915). Multi-core cable. J. H. Powden, 101 Eltham Road, and H. F. J. Thompson, 65 Cambridge Mansions, Battersea Park—both in London.
 103,412. Crutch with inflatable rubber bag upon the top of the crutch head. A. R. Hunter, Pine Lodge, Welbeck, near Workop, Nottinghamshire.
 103,434. Life-saving attachment. S. Goldreich, C. A. McKerrrow, T. G. Jacobs and Life Saving Device Syndicate, Basilston House, Moorgate street, London.
 103,452. Spring wheel with rubber shock tire. W. E. Supernaw, 380 Alexander avenue, Elgin, Illinois, U. S. A.
 103,471. Double-ended inner tube. Miller Rubber Co., assignees of F. Felton—both of Akron, Ohio, U. S. A.
 103,478. Tire inflating valves. M. C. Schweinert, 226 Palisade avenue, West Hoboken, New Jersey, U. S. A.
 103,485. Hand tools for artificial arms comprising a rubber-faced arm section. Siemens-Schuckertwerke, Siemensstadt, near Berlin.
 103,491. A safety pocket closing device comprising an endless elastic band. J. W. Hawkins, Munsfordville, Kentucky, U. S. A.
 103,522. Tire inflating valve. T. Sloper, Southgate, Devizes, Wiltshire.

THE DOMINION OF CANADA.

ISSUED DECEMBER 30, 1916.

- 173,613. Hoof pad. E. Kempshall, Atlantic City, New Jersey, U. S. A.
 173,619. Pneumatic tire. A. M. Kobiolk, Kew, near Melbourne, Victoria, Australia.
 173,663. Pneumatic tire. R. G. Wooten, Toronto, Ontario.
 173,736. Pneumatic tire. J. C. Anderson, Washington, District of Columbia, U. S. A.
 173,748. Rim for pneumatic tires. G. Cassady, New Westminster, British Columbia.
 173,761. Demountable rim. H. E. Doebler, Cannon Falls, Minnesota, U. S. A.
 173,771. Flexible rim. O. Gingras, Laurierville, Quebec.
 173,795. Resilient tire. J. La Plant, Malone, New York, U. S. A.
 173,818. Metal filler for pneumatic tires. C. M. Nevins, Hillsdale, Michigan, U. S. A.
 173,821. Cushion tire. W. H. Overmoyer, Roselawn, Indiana, U. S. A.
 173,838. Clincher tire rim. D. H. Shapiro, Montreal, Quebec.
 173,852. Inner tube. E. W. Wilson, Springfield, Illinois, U. S. A.
 173,853. Tire rim. E. W. Wilson, Springfield, Illinois, U. S. A.
 173,854. Pneumatic tire. E. W. Wilson, Springfield, Illinois, U. S. A.
 173,860. Tire rim. P. S. Whiting, Detroit, Michigan, U. S. A.

- 173,861. Tire rim. P. S. Whiting, Detroit, Michigan, U. S. A.
 173,913. Spring and rubber cushion tire. H. L. McNeill, Truro, Nova Scotia.
 173,960. Garter. M. B. Hammond, Bridgeport, Conn.
 173,964. Rim tool. M. M. Herman, Danville, Virginia, U. S. A.
 174,062. Garter. G. Abraham, New York City, assignee of H. E. Grabau, Long Island City—both in New York, U. S. A.
 174,080. Tire tread. R. Aue, Leon Springs, Texas, U. S. A.
 174,137. Spring and rubber cushion tire. B. A. Lange, St. Louis, Missouri, U. S. A.
 174,143. Cushion tire. J. Milne, New York City, U. S. A.
 174,232. Pneumatic tire. E. Knechtel, Toronto, and A. Snelgrove, assignee of a third interest, Fort William, Thunder Bay District—both in Ontario.
 174,247. Demountable rim. I. D. Walter, assignor; J. G. Gant and T. Flournoy, each one-twentieth of the interest; J. W. Gant and S. A. Latimer, each one-fiftieth; and B. F. Cole, one-tenth, and to J. Brunkerhoff, fifty-three one-hundred and fiftieths of the interest—all of Harrisburg, Arkansas, U. S. A.

THE FRENCH REPUBLIC.

PATENTS ISSUED (WITH DATES OF APPLICATION).

- 481,922 (May 31, 1916). Metal tire. C. Montanari.
 481,929 (June 2, 1916). Improvement in tools for removing tires. A. A. Friestedt.
 481,937 (June 3, 1916). Pneumatic tire with envelope composed of a number of removable elements. P. E. Van Berendonck.
 481,954 (June 5, 1916). Improvements in pneumatic tires. G. Ishihara.
 481,955 (June 5, 1916). Insulators for storage batteries. India Rubber Co.
 481,966 (June 7, 1916). Valve for pneumatic tires with device for indicating the air pressure. Ashelman and Johnson.
 482,032 (June 14, 1916). Elastic wheel for vehicles. J. Duran-Pinana.
 482,038 (June 16, 1916). Improvements in hollow tires. W. Humphrys.
 482,073 (June 19, 1916). Apparatus for removing the insulating sheath from electric wires.

AUSTRALIA.

PATENTS ISSUED (WITH DATES OF APPLICATION).

- 305 (February 14, 1916). Contrivance to prevent capillary attraction of waterproof garments. W. H. Poppleston for R. H. Poppleston, England.
 950 (May 6, 1916). Improvements in tire valve caps and analogous devices. Schrader's Son, Inc., for H. P. Kraft, New Jersey, U. S. A.
 951 (May 6, 1916). Improvements relating to washers for tire valve caps. Schrader's Son, Inc., for H. P. Kraft, New Jersey, U. S. A.
 1081 (May 25, 1916). Improvements in pneumatic tires. C. Phillips and V. Sudakoff, New South Wales.
 1735 (August 8, 1916). Pneumatic tire cover to prevent cavities between the inner and outer casings when they are combined. S. R. V. Clifford, Victoria.

TRADE-MARKS.

THE UNITED STATES.

- 100,143. The words SWEET BABLE, nurses, nursing bottles, and rubber nipples. D. W. B. Smith, Utica, N. Y.
 71,059. The word UNDA rubber boots and shoes. L. Conlee & Co., New Haven, Conn.
 98,346. The words EASY RITE—men's and ladies' leather, rubber and cloth shoes, raincoats, etc. John P. Davis, Chicago, Ill.
 100,191. The word MURKITE tennis balls. The Seamless Rubber Co., New Haven, Conn.
 100,593. The word SEMO belting, hose, machinery packing, and non-metallic tires. Semple Rubber Co., Trenton, N. J.
 100,696. The words FRUIT & FLOWERS—chewing gum. American Chiclet Co., New York City.
 100,836. The words LIMP IN AND WALK OUT—rubber and leather footwear. B. Wigely, Chillicothe, Mo.
 101,153. The words BEN HUR—rubber tires, hose and belting. The Midland Tire & Rubber Co., Cleveland, Ohio.
 101,160. The word USCO—rubberized air-craft fabrics. United States Rubber Co., New York City.
 101,413. The word MAGNET rubber boots and shoes and fabric shoes having rubber soles attached thereto by vulcanization. United States Rubber Co., New York City.
 101,414. The word PARAMOUNT—rubber boots and shoes and fabric shoes having rubber soles attached thereto by vulcanization. United States Rubber Co., New York City.
 101,416. The word LEANLY rubber boots and shoes and fabric shoes having rubber soles attached thereto by vulcanization. United States Rubber Co., New York City.
 101,611. The word ARLEN—lightweight rubbers. Mishawaka Woolen Manufacturing Co., Mishawaka, Ind.
 101,612. The word RONDO—lightweight rubbers. Mishawaka Woolen Manufacturing Co., Mishawaka, Ind.
 101,614. The word ZOLA—lightweight rubbers. Mishawaka Woolen Manufacturing Co., Mishawaka, Ind.
 101,615. The word MISHKO—composition soles used on rubber and woolen footwear. Mishawaka Woolen Manufacturing Co., Mishawaka, Ind.
 99,833. The word MICHINDO and a representation of Mephistopheles—compressed fiber sheet packing. Asbestos Fibre & Rubber Co., Trenton, N. J.
 100,736. The word UNIVERSAL and the representation of a globe showing the western hemisphere including North and South America—rubber heels. J. H. Brown, Marseilles, Ill.
 101,324. The word COLONIAL rubber tires for automobiles and other vehicles. The Colonial Tyre & Rubber Co., New York City.
 101,490. The word EMERGENCY—rubber. F. W. Howell, New York City.

The word **ITALY**—valves, leather, and combination canvas and rubber belting. Hudson Mechanical Rubber Co., New York City.

THE UNITED KINGDOM.

- 376,919. The word **ECLIPSE**—hair combs. The North British Rubber Co., Limited, Edinburgh, Scotland.
 376,988. The word **TALISMAN**—hair combs. The North British Rubber Co., Limited, Edinburgh, Scotland.

THE DOMINION OF CANADA.

- 22,191. The word **RUB-STEEL**—valves, tools, machine parts and hardware. Voorhees Rubber Manufacturing Co., Jersey City, New Jersey, U. S. A.
 22,192. The word **INSTANT**—chewing gum. Camdent Sene Gum Co., Inc., New York City, U. S. A.
 22,193. The word **EXTRACT**—vulcanite combs. The North British Rubber Co., Limited, Toronto, Ontario.
 22,194. The word **BEAVER**—vulcanite combs. The North British Rubber Co., Limited, Toronto, Ontario.
 22,235. The word **ARCOC**—tires and other goods used on or with motor vehicles, and manufactured in whole or in part of rubber. E. P. Stephenson, Toronto, Ontario.

ITALY.

- 16,156. The word **VIKING**—tires. Palmer Tyre, Limited, London.

AUSTRALIA.

- 21,112. Representation of a beaver crouching in front of hollowed-out branch—goods manufactured from rubber and gutta percha. Canadian Consolidated Rubber Co., Limited, Montreal, Quebec, Canada.

DESIGNS.

THE UNITED STATES.

- 5,512. A tire tread with a specially designed corrugated surface. Term 14 years. Patented March 27, 1917. A. Johnston, assignor to The North British Rubber Co., Limited, Edinburgh, Scotland.
 50,553. A tire tread. Term 7 years. Patented April 3, 1917. J. P. Colquhoun, Edinburgh, Scotland.



DESIGNS FOR TIRES.

THE DOMINION OF CANADA.

- 4,170. Non-skid tread for the tires of automobiles and similar wheels. The F. E. Partridge Rubber Co., Limited, Guelph, Ontario, Canada.

STATEMENT OF THE INDIA RUBBER WORLD.

Statement of the ownership, management, etc., required by the Act of Congress, October 3, 1917, of THE INDIA RUBBER WORLD, published monthly at New York, N. Y., for April 1, 1917.

Before me, a notary public in and for the State and county aforesaid, personally appeared E. M. MacPhee, who having been duly sworn according to law, deposes and says that she is the Business Manager of THE INDIA RUBBER WORLD, and that the following is, to the best of her knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 443, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are:

Publisher, The India Rubber Publishing Co., 25 West Forty-fifth street, New York City.

Editor, Henry C. Pearson, 83 Agawam Road, Waban, Massachusetts.

Managing Editor, None.

Business Manager, E. M. MacPhee, 25 West Forty-fifth street, New York City.

2. That the owners are: (Give names and addresses of individual owners, or, if a corporation, give its name and the names and addresses of stockholders owning or holding 1 per cent or more of the total amount of stock.) Henry C. Pearson, 83 Agawam Road, Waban, Massachusetts.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.) None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by her.

E. M. MACPHEE, Business Manager.

Sworn to and subscribed before me this 31st day of March, 1917.

[SEAL]

FREDK. SPRENGER.

Notary Public, Westchester County.

Certificate filed in New York County.

New York County Clerk No. 188. Register's No. 8226.

(My commission expires March 30, 1918.)

RUBBER TRADE INQUIRIES.

THE inquiries that follow have already been answered; nevertheless they are of interest not only in showing the needs of the trade, but because of the possibility that additional information may be furnished by those who read them. The editor is therefore glad to have those interested communicate with him.

[291.] An inquirer seeks a manufacturer able to make a special type of automobile tire.

[292.] An inquiry has been received for Holland cloth.

[293.] Names and addresses of manufacturers of spreading and doubling machines are requested.

TRADE OPPORTUNITIES FROM CONSULAR REPORTS.

A merchant in Nicaragua desires to purchase garters and sleeve supporters. Report No. 24,056.

Samples and quotations from American manufacturers and exporters of suitings for rainproof capes are desired by a firm in the Dutch East Indies. Report No. 24,112.

A manufacturer in Spain is in the market for machinery for making rubber balls and other rubber articles. Report No. 24,125.

A firm in Chile wishes to buy elastic goods, garters and other accessories used in making corsets. Report No. 24,139.

A firm in Spain is in the market for tire presses. Report No. 24,166.

An agency for the sale of vulcanized rubber goods is desired by an applicant in Peru. Report No. 24,168.

A company in China wishes to receive catalogs, prices, etc., from American manufacturers of druggists' sundries. Report No. 24,180.

An applicant in Denmark desires to purchase or secure the agency for the sale of rubber goods, such as automobile and bicycle tires, inner tubes, boots and shoes, air and water cushions, gloves, tennis balls, football bladders, combs, sponges and sponge bags. Report No. 24,201.

A firm in the United States, representing firms in Mexico, Porto Rico, Spain, Australia and Switzerland, is in the market for electrical supplies and hard rubber razor handles. Report No. 24,215.

Representation of American manufacturers and exporters of automobile tires and accessories is desired by an applicant in Spain. Report No. 24,252.

An agency is desired by a man in Switzerland for the sale of rubber and rubber goods. Report No. 24,270.

A COMMERCIAL ATTACHE AT TOKIO.

The recent appointment of Frank R. Rutter as commercial attaché at Tokio directs attention once more to our increasing staff of so-called "trade diplomats" through which the United States hopes to improve its commercial relations abroad. Our broadening trade opportunities were recognized by the Government soon after the outbreak of the European war and attachés have since been stationed at London, Paris, Petrograd, Peking, Melbourne, Buenos Aires, Rio de Janeiro, Lima and Santiago, Chili. The growing importance of American trade with Japan has led to another similarly happy appointment by Secretary Redfield. Mr. Rutter is well fitted for the post, having been assistant chief of the Bureau of Foreign and Domestic Commerce, in charge of the statistical, editorial, foreign tariff and cost of production work of the Bureau. He has an intimate knowledge of the tariff laws of foreign countries and the methods of administering them, and for several years has been a lecturer on commerce in several universities, including Johns Hopkins, of which he is a graduate.

The United States Post Office authorities have declared the Double Service Tire & Rubber Co., Akron, Ohio, fraudulent and are returning to the writers all mail directed to this concern.

Review of the Crude Rubber Market

Copyright 1917.

NEW YORK.

CRUDE rubber business during the past month has been considered fair in some quarters, while in others trading has been reported as dull and featureless. While considerable turn-over business has been freely indulged in by the dealers forming the bulk of the month's transactions, the manufacturers have covered their immediate requirements by quietly picking up small lots. The war declaration was followed by a very firm undertone and stiffer prices that seemed to pre-empt the advance forecasted by the bull element. However, the movement lacked support and the market eased off without recording price changes worthy of mention. Even the report of a government tax on crude rubber failed to stimulate the dormant buying interests; however, later it was reported that the war revenue measure would not include crude rubber.

The scarcity of bottoms and the unfavorable financial conditions in the Far East are delaying direct shipments, four months being required for cargoes *via* Pacific Coast ports. Moreover, the preference given by the railroads to necessities, such as foodstuffs, military supplies, etc., has resulted in holding rubber arrivals at Seattle and San Francisco. Spot stocks appear to be cleaned up and nearby is getting very scarce. Arrivals are slow and the shipping situation continues to grow steadily worse. During the month several direct New York shipments from the East were diverted to Liverpool and London, a fact that still further shows the lack of bottoms. Freight rates from Colombo have advanced, and the insurance on London shipments is now 5 guineas the ton, equivalent to \$25 United States money.

Plantation prices have shown very little change during the month. April 1 first latex and smoked sheet ribbed, spot, were quoted 81 cents; April-May, 79 cents, and July-December, 73 cents. Upriver fine spot was 76½ cents. Steady conditions prevailed during the month, with minor price changes and on April 27 first latex and smoked sheet ribbed, spot, were 82 cents; May-June, 80 cents, and July-December, 75 cents. Market conditions very firm. The knowledge that there is plenty of rubber at producing centers is having a steadying effect on the market that would otherwise be adversely influenced by the shipping situation. Africans have received but little attention, while Centrals, particularly during the last week of the month, were in active demand.

LONDON.

Quiet conditions have ruled the London market during April; however, the undertone has been generally steady. Conservative buying has characterized the trading that lacked in volume, due to the absence of real interest. The effect of America's entry in the war was watched with interest in London, and when the active buying that was expected did not occur the trade settled down to watchful waiting. Prices, show very little change for the first three weeks of the month, holding around 75 cents for first latex and smoked sheet ribbed. On April 27 the standard plantation grades were quoted 36d., or about 72 cents in a very firm market.

The following estimate of the world's production and consumption of rubber during the next four years is by C. A. Lampard, the well-known rubber prophet, now deceased:

Year.	Production.	Consumption.
1917.....tons	235,000	300,000
1918.....	265,000	260,000
1919.....	285,000	270,000
1920.....	314,000	312,000

No allowance has been made in these estimates for the German and Austrian post-war demand, which is not expected to be less than 26,000 tons per annum. Apart from this it will be seen that during the four years in question it is thought that supply and demand will remain very nearly balanced.

London imports for February were 4,748 tons, compared to 6,364 tons for January. Re-exports were 5,043 tons, compared to 4,473 tons for January. Liverpool imports for February were 2,410 tons, compared to 1,215 tons for January. Re-exports were 1,331 tons, compared to 976 tons for January.

SINGAPORE.

The cables from Singapore indicate a good demand for all grades. At the auctions, held March 30, April 6, 14 and 21, the average prices obtained were as follows: First latex, crêpe, 68.6 cents; smoked sheet ribbed, 68.9 cents. The total amount sold was 2,105 tons.

NEW YORK SPOT QUOTATIONS.

	May 1, 1916.	April 1, 1917.	April 27, 1917.
PLANTATION PARAS—			
First-latex crêpe	78½	81	82
Amber crêpe, light gristly.....	76	79	78½
Amber crêpe, dark .....	..	77	78
Brown crêpe, thick clean .....	..	75	77
Brown crêpe, thin clean, light mottled.	..	78	78
Brown crêpe, thin clean	75	77	77
Brown crêpe, thin specky .....	..	72	72
Brown crêpe, thin barkey.....	..	69	68
Brown crêpe, rolled .....	..	65	65
Smoked sheet, ribbed standard quality.	77½	81	82
Smoked sheet, plain standard quality..	..	79	80½
Unsmoked sheet, standard quality....	..	78	78½
Singapore scrap, No. 1.....	..	63	63
Singapore scrap, No. 2.....	..	61	61
Colombo scrap, No. 1.....	..	64	64
Colombo scrap, No. 2.....	..	62	62
BRAZILIAN PARAS—			
Upriver fine	70½	76½	75
Upriver medium	65	70	70
Upriver coarse	54½	51½	51
Knapsack Madeira .....	..	82	82
Peruvian fine .....	..	74	73
Upriver weak fine.....	..	65	65
Upriver caucho ball	55	51½	51
Tapajos fine .....	..	74	73
Islands fine .....	..	72	72
Islands medium .....	..	66	66
Islands coarse .....	..	56	53½
Islands weak fine .....	..	54	54
Cameta	38½	38	36½
Lower caucho ball .....	..	48	48
AFRICANS—			
Accra flake .....	..	33	31
Niger flake .....	..	34	31
Beniguela, No. 1 .....	..	41½	41½
Beniguela, No. 2 .....	..	39	39
Beniguela, No. 3, 40 .....	..	33½	33½
Congo prime, black upper .....	..	65	63
Congo prime, red upper .....	..	60	59
Rio Nunez ball .....	..	66	66
Rio Nunez sheets and strings.....	..	66	66
Conakry niggers .....	..	65	66
Massai sheets and strings.....	..	65	65
CENTRAIS—			
Esmeralda sausage	50	50	50
Central scrap	49	49	49
Central scrap and strip.....	48	48	48
Central wet sheet	35	35	35
Guayule .....	..	44	50
MANICOBAS—			
Ceara scrap .....	..	35	35
Ceara negro heads .....	..	49	49
Manicoba special .....	..	38	38
Manicoba extra .....	..	35	35
Manicoba regular .....	..	32	32
Mangabeira thin sheet .....	..	38	38
Mangabeira thick sheet .....	..	33	33
PALATA—			
Balata block .....	..	68	65
Surinam sheet .....	..	95	95
EAST INDIAN—			
Assam crêpe .....	..	75	75
Assam onions .....	..	73	73
Penang block scrap .....	..	35	35
Pontianak pressed .....	..	25	25
Bandjermassin .....	..	20	20
Gutta percha, red Macassar .....	..	210	225

COMPARATIVE NEW YORK PRICES FOR APRIL.

In regard to the financial situation, Albert B. Beers (broker in crude rubber and commercial paper, No. 68 William street, New York) advises as follows:

"The market for rubber has been very quiet and the demand not so well known 50 5/8 per cent, but since the middle of the month the demand has fallen off considerably and rates are rather higher."

Grade	Price	Grade	Price
Standard Crepe	57 1/2	Standard Smoked	57 1/2
First Quality	57 1/2	First Quality	57 1/2
Second Quality	57 1/2	Second Quality	57 1/2
Third Quality	57 1/2	Third Quality	57 1/2
Fourth Quality	57 1/2	Fourth Quality	57 1/2
Fifth Quality	57 1/2	Fifth Quality	57 1/2
Sixth Quality	57 1/2	Sixth Quality	57 1/2
Seventh Quality	57 1/2	Seventh Quality	57 1/2
Eighth Quality	57 1/2	Eighth Quality	57 1/2
Ninth Quality	57 1/2	Ninth Quality	57 1/2
Tenth Quality	57 1/2	Tenth Quality	57 1/2

MARKET CABLE SERVICE FROM LONDON.

The following reports of the weekly auctions held at London have been cabled by The Waterhouse Co., Limited, London.

Date.	Standard Crepe.	Ribbed Smoked Sheets.	Market.
March 30	57 1/2	57 1/2	Quiet.
April 6	57 1/2	57 1/2	Steady.
April 13	57 1/2	57 1/2	Buyers.
April 20	57 1/2	57 1/2	Buyers.
April 27	57 1/2	57 1/2	Buyers.

MARKET CABLE SERVICE FROM SINGAPORE.

The following reports of the weekly auctions held at Singapore have been cabled by The Waterhouse Co., Limited:

Date.	Crepe price per lb.	Sheet price per lb.	Tons sold.	Market.
March 30	68.00	68.42	575	There is more demand.
April 6	68.85	69.70	562	Firm, with an upward tendency.
April 13	69.70	69.70	530	Good demand for all descriptions.
April 21	68.00	68.00	438	Dull with a downward tendency.

WEEKLY RUBBER REPORT.

Guthrie & Co., Limited, Singapore report, March 8, 1917.

At the weekly rubber auction held yesterday and today a further advance in the prices of standard grades was registered. Fine ribbed smoked sheet fetched up to \$175 per picul for one lot, being \$3 above last week's best. The highest paid for fine pale crepe was \$174, an advance of \$4. Of unsmoked sheet only the better quality lots were in demand, and a considerable quantity was bought in. Brown crepes sold well, at about last week's prices, but dark and baky crepes were neglected, and suffered a decline in values. Demand throughout was somewhat erratic, and eased off towards the end of the sale. The quantity sold was 580 tons, out of a total of 864 tons catalogued.

The following was the course of values:

	In Singapore per picul.*	Sterling equivalent per pound in London.	Equivalent per pound in cents.
Sheet, fine ribbed smoked.....	\$168@175	3/ 234@3/ 4 3/4	71.40@74.37
Sheet, good ribbed smoked.....	140@167	2/ 8 7/8@3/ 2 5/8	59.50@70.97
Sheet, plain smoked.....	132@146	2/ 7 1/4@2/ 10 1/2	56.10@62.05
Sheet, ribbed unsmoked.....	133@135	2/ 7 3/4@2/ 7 7/8	56.52@57.37
Sheet, plain unsmoked.....	105@135	2/ 1 1/2@2/ 7 7/8	44.62@57.37
Crepe, fine pale.....	170@174	3/ 3 3/4@3/ 4	72.25@73.95
Crepe, good pale.....	154@170	2/ 11 1/2@3/ 3 3/4	65.45@72.25
Crepe, fine brown.....	140@153	2/ 8 7/8@2/ 11 1/2	59.50@65.02
Crepe, good brown.....	122@141	2/ 5 3/4@2/ 9 3/8	51.85@59.92
Crepe, dark.....	101@126	2/ 0 3/4@2/ 6	42.92@53.55
Crepe, baky.....	77@114	1/ 7 1/2@2/ 3 1/2	37.75@48.45
Scrap, virgin and pressed.....	86@	1/ 9 1/2@	36.55@
Scrap, house.....	65@ 93	1/ 5 3/4@1/ 11 3/4	27.75@39.52

* Picul = 133 1/3 pounds.

Quoted in S. S. dollars = 2/4 [56.7 cents].

PLANTATION RUBBER FROM THE FAR EAST.

TOTAL EXPORTS FROM MALAYA.

(From January 1, 1916, to dates named, excluding all foreign transshipments. Reported by Barlow & Co., Singapore.)

To—	From Singapore, January 31, 1917.	Malacca, January 31, 1917.	Penang, January 31, 1917.	Port Swettenham, January 27, 1917.	Totals.
United Kingdom ..lbs.	3,251,880	659,475	2,591,600	2,966,128	9,469,083
The Continent	108,121	.....	47,067	.....	155,188
Japan	427,535	.....	.....	.....	427,535
Ceylon	131,009	.....	109,867	87,368	328,244
United States	6,110,552	.....	1,456,533	523,024	8,090,109
Totals	10,029,097	659,475	4,205,067	3,676,520	18,460,159
Same period, 1915 ..	11,494,667	408,800	5,946,267	2,529,553	20,379,287
Same period, 1914 ..	4,408,928	537,281	4,135,865	3,188,608	11,265,682
Same period, 1913 ..	2,771,704	.....	3,717,200	2,594,807	9,083,711

IMPORTS AND EXPORTS OF RUBBER AND GUTTA AT SINGAPORE.*

IMPORTS.

February, 1917.

	Para Rubber.	Para Rubber for Treatment.	Borneo Rubber.	Gutta Percha.	Gutta Jelutong.
Malay Peninsula—					
Port Swettenham	1,295,200	.....	.....	.....	.....
Teluk Anson	905,999	.....	.....	.....	.....
Muar	649,999	.....	.....	.....	.....
Malacca	611,733	592,798	.....	.....	.....
Penang	504,332	38,533	.....	.....	.....
Port Dickson	161,999	.....	.....	.....	.....
Kelantan	141,876	17,600	.....	.....	.....
Kuantan	20,123	.....	.....	.....	.....
Rengat	15,600	16,799	.....	.....	.....
Mosong	6,533	.....	.....	.....	.....
S. Penang	1,066	.....	.....	.....	.....
Totals	4,274,454	665,730	.....	.....	.....
Borneo—					
Sarawak	72,133	30,000	800	10,133	218,666
Pontianak	59,866	2,000	2,800	1,500	14,800
Jesschen	47,332	187,430	.....	400	.....
Bandjennassin	42,266	46,400	4,000	102,933	24,000
Lahat	37,866	.....	.....	1,866	62,933
Sibu	31,866	.....	133	16,533	84,400
Sandakan	12,532	25,066	.....	.....	1,066
Sambas	10,533	.....	.....	.....	.....
Passir	9,066	.....	.....	.....	.....
Kndir	8,533	10,133	.....	.....	.....
Singawang	533	.....	.....	.....	.....
Samarinda	400	.....	1,733	400	.....
Totals	332,066	301,029	9,466	134,264	405,865
Sumatra—					
Djambi	219,600	.....	.....	.....	.....
Delir	39,866	626,266	.....	.....	.....
Palembang	17,733	.....	.....	.....	45,999
Indragiri	5,066	.....	.....	.....	.....
Bengkalis	2,666	.....	.....	.....	.....
Muntok	1,200	.....	.....	.....	.....
Asahan .....	.....	67,199	.....	.....	.....
Belawan .....	.....	86,399	.....	.....	.....
Totals	286,931	779,864	.....	.....	45,999
Java					
Batavia	188,666	.....	.....	.....	.....
Soerabaya	152,800	.....	.....	1,466	.....
Samarang	7,966	.....	.....	.....	.....
Totals	348,432	.....	.....	1,466	.....
Burma—					
Merga	12,433	.....	.....	.....	.....
Rangoon	6,266	.....	.....	.....	.....
Total	19,199	.....	.....	.....	.....
Siam					
Bangkok	1,199	.....	.....	.....	.....
Patani	133	.....	.....	.....	.....
Total	1,332	.....	.....	.....	.....
Other ports	117,066	205,600	7,733	15,066	96,800
Grand Totals	5,380,380	1,952,223	17,899	156,796	548,664

* Not complete; 6 days missing.

EXPORTS.

February, 1917.

To—	Para Rubber.	Para Rubber Trans-shipped.	Borneo Rubber.	Gutta Percha.	Gutta Jelutong.
NORTH AMERICA:					
United States—					
New York	3,912,800	482,933	.....	114,533	629,466
Akron	1,421,399	18,000	.....	.....	.....
Seattle	77,666	99,866	.....	.....	.....
Boston	127,333	.....	.....	.....	.....
San Francisco	82,933	.....	.....	.....	.....
Denver	33,600	.....	.....	.....	.....
Canada—					
Vancouver	521,266	53,733	.....	.....	.....
Totals	6,869,997	654,532	.....	114,533	629,466
EUROPE:					
United Kingdom—					
England—					
London	980,531	1,876,999	.....	22,800	.....
Liverpool	587,733	260,999	.....	.....	56,533
Scotland—					
Glasgow .....	.....	.....	.....	11,466	.....
France (Marseilles)	176,933	.....	.....	.....	.....
Russia (Vladivostok)	4,266	.....	.....	.....	.....
Totals	1,749,463	2,137,998	.....	34,266	56,533
Grand Totals	8,619,460	2,792,530	.....	148,799	685,999

STRAITS SETTLEMENTS RUBBER EXPORTS.

An official cablegram from Singapore gives the export of plantation rubber from the Straits Settlements for the month of February as 6,495 tons (of which 1,079 tons represent transshipments) compared with 3,562 tons in January and 3,359 tons in the corresponding month last year. The following are the comparative figures:

	1915.	1916.	1917.
Exports	3,359	3,562	6,495
Transshipments	1,079	1,079	1,079
Total	5,317	7,802	10,057

RUBBER EXPORTS FROM JAVA.

		January.	
		1916.	1917.
PLANTATIONS TO—			
Great Britain.....	Ficus ...	1,364	515
	Hevea ...	463,680	250,880
	Ceara ...		2,158
	Castilloa ...	5,685	2,638
	Totals	470,729	256,191
United States.....	Hevea ...	884,800	2,260,160
	Totals	892,793	2,262,738
Singapore	Hevea ...	2,053	2,398
	Hevea ...	210,560	486,080
	Castilloa ...	1,168	1,784
	Totals	216,036	490,262

IMPORTS AND EXPORTS OF RAW RUBBER AT CEYLON.

		March 12, 1917	
		Straits Settlements	Burma and other countries.
Imports			
Port of Shipment.			
Port Swettenham		40,119	
Port Dickson		21,325	
Penang		2,887	
Tuticorn			33,335
Cochin			19,161
Alleppey			1,540
Totals		69,281	54,036
Exports.			
Port of Destination.			
United States			
New York		1,346,003	
Seattle		44,740	
Port		13,440	
Alaska		4,480	
Canada			
Vancouver		44,814	
Toronto		31,360	
England			
Liverpool			2,993,777
Liverpool			184,816
Manchester			10,467
Russia (Vladivostok)			123,180
France (Marseilles)			80,557
Australia			
Melbourne			18,340
Sydney			2,240
Japan (Yokohama)			2,448
Totals		1,479,037	3,292,797

EXPORTS OF CEYLON GROWN RUBBER.

(From January 1 to March 12, 1916 and 1917. Compiled by the Ceylon Chamber of Commerce.)

To—	1916.	1917.
United Kingdom	4,360,745	7,157,797
France	398,050	639,577
Italy		3,666
Russia	18,695	123,180
Victoria	145,616	63,161
New South Wales	16,428	7,840
United States	6,020,090	3,523,662
Canada and Newfoundland		11,814
India	550	
Japan	36,436	11,168
Totals	10,990,610	11,772,799

(Same period 1915, 7,853,033 pounds; same period 1914, 7,317,507.) The export figures of rubber, given in the above table for 1914, include the imports reexported. (These amount to 246,549 pounds from the Straits Settlements and 633,848 pounds from India.) To arrive at the total quantity of Ceylon rubber exported for that year deduct these imports from the total exports. The figures for 1916 and 1917 are for Ceylon rubber only.

Japan		
Other Countries	Hevea	6,720
Grand Totals	1,613,158	3,015,911

EXPORTS OF RAW RUBBER FROM PENANG.

		February, 1917.		
		Para Rubber.	India Rubber.	Borneo Rubber.
North America:				
United States—				
Seattle	pounds	639,733		
New York		179,200		
Akron		22,266		
Canada—				
Vancouver		20,133		
Total		861,332		
Europe:				
United Kingdom—				
England		197,333		

MOVEMENTS OF ALL KINDS OF RUBBER IN THE UNITED KINGDOM.

		February.			January.		
		1917.	1916.	1915.	1917.	1916.	1915.
From—							
Dutch East Indies		1,440	1,440	1,440	1,440	1,440	1,440
French West Africa		38	38	38	38	38	38
G. D. Coast		22	22	22	22	22	22
Other Countries in Africa		355	382	35	859	617	431
Peru		64	12	11	148	36	36
British India		208	56	155	424	292	372
Straits Settlements		1,337	1,457	2,342	2,710	3,717	5,792
Federated Malay States		1,976	489	753	4,908	1,888	1,844
Ceylon and Dependencies		647	702	1,558	1,672	1,791	3,444
Other Countries		255	56	132	428	156	227
Total imports		7,307	4,592	6,191	15,281	11,190	13,938

EXPORTS.

From—	1917.	1916.	1915.	1917.	1916.	1915.
United Kingdom	6,492	4,429	4,966	12,216	8,267	6,855

Compiled by Ceylon Chamber of Commerce, Ltd.

CRUDE RUBBER ARRIVALS AT THE PORT OF NEW YORK.

The following statistics are not complete, due to Government orders prohibiting access to the records.

PARAS.

Fine. Medium. Coarse. Caucho. Cameta. Totals.

MARCH 27 By the *Alliance*—Lima:

Muller, Schall & Co.	1,800	2,330			2,458
Henderson & Korn	2,100				2,100

MARCH 31.—By the *Cuthbert*—Para and Manaos:

Meyer & Brown	118,000	15,000	77,000	125,000	39,000	374,000
Hagemeyer Trading Co.	22,400			44,800		67,200
H. A. Astlett & Co.	66,080	10,640	51,520	20,160		148,400
Raw Products Co.	15,280					20,945
Raw Products Co.	23,100			23,310		46,410

APRIL 3.—By the *Colon*—Bolivia:

Muller, Schall & Co.	13,758	4,471				18,229
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APRIL 4.—By the *Mandeville*—Porto Colombia:

Muller, Schall & Co.	917					915
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APRIL 4.—By the *Sao Paulo*—Para:

Muller, Schall & Co.	41,255	15,313	55,582	17,482		129,632
Meyer & Brown	29,000	5,000	29,000	22,000	14,800	99,800
Henderson & Korn	55,200	3,200	52,400	33,800		144,600
Hagemeyer & Brown	44,800		11,200	22,400		79,400
H. A. Astlett & Co.	8,400	1,680	105,280	154,560		376,880
Raw Products Co.	8,836					8,836

APRIL 13.—By the *Guajira*—Manoas and Para:

Muller, Schall & Co.	158,625	11,968	57,622	82,902		311,117
Meyer & Brown	200		46,000	187,000		233,000
Henderson & Korn	2,200	14,500	61,200	26,200		104,100
Hagemeyer & Brown	160,000		5,200	4,500		19,780
H. A. Astlett & Co.	162,960	10,080	69,440	94,080		337,560
Raw Products Co.	14,222					21,246

APRIL 6.—By the *Zulia*—Ca Boliyar:

Velez & Co., Inc.	2,874					2,871
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APRIL 25.—By the *Tela*—Para:

Aldens' Successors, Ltd.	2,000	12,000	42,600	27,600		84,200
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PARA VIA EUROPE.

	POUNDS.
MARCH 10.—By the <i>Carmania</i> =London:	
Henderson & Korn (Course).....	26,000
J. T. Johnstone & Co.....	2,800

PLANTATIONS.

The following statistics are not complete due to Government orders prohibiting access to the records:

MARCH 3.—By the <i>Mesaba</i> =London:	
Rubber Trading Co.....	56,000
Meyer & Brown.....	66,000

MARCH 17.—By the <i>Philadelphia</i> =London:	
Rubber Trading Co.....	15,680
Meyer & Brown.....	34,000
J. T. Johnstone & Co.....	54,640

APRIL 1.—By the <i>Mesaba</i> =London:	
Rubber Trading Co.....	44,800
Raw Products Co.....	5,818

APRIL 2.—By the <i>Carpathia</i> =London:	
Meyer & Brown.....	15,000
J. T. Johnstone & Co.....	112,000

MARCH 27.—By the <i>Eurybates</i> =Penang:	
Rubber Trading Co.....	107,520
Meyer & Brown.....	78,000
Henderson & Korn.....	275,200
Raw Products Co.....	15,680
Fred Stern & Co.....	49,280

MARCH 27.—By the <i>Barotse</i> =Colombo:	
J. T. Johnstone & Co.....	310,000
Rubber Trading Co.....	11,200
Meyer & Brown.....	437,000
Henderson & Korn.....	35,600
Raw Products Co.....	11,200
Fred Stern & Co.....	112,000
J. T. Johnstone & Co.....	135,000

APRIL 4.—By the <i>Merauke</i> =Batavia:	
Meyer & Brown.....	70,000
Rubber Trading Co.....	22,400
Raw Products Co.....	37,630
Hagemeyer Trading Co.....	72,196
Fred Stern & Co.....	6,720
J. T. Johnstone & Co.....	280,000

APRIL 8.—By the <i>Manhattan</i> =London:	
Meyer & Brown.....	142,000
Rubber Trading Co.....	44,800
Henderson & Korn.....	66,200
Raw Products Co.....	11,144
Hagemeyer Trading Co.....	38,371
Fred Stern & Co.....	31,822

APRIL 9.—By the <i>City of Edinburgh</i> =Colombo:	
Meyer & Brown.....	62,000
Rubber Trading Co.....	13,400
Fred Stern & Co.....	100,488
J. T. Johnstone & Co.....	72,000

APRIL 10.—By the <i>Ansonia</i> =London:	
Meyer & Brown.....	119,000
Rubber Trading Co.....	33,600
Henderson & Korn.....	62,800

APRIL 16.—By the <i>Lancastrian</i> =London:	
Meyer & Brown.....	11,000
Rubber Trading Co.....	11,200
Henderson & Korn.....	85,600
Hagemeyer Trading Co.....	22,400

APRIL 12.—By the <i>Mohopac</i> =London:	
Raw Products Co.....	44,800
Aldens' Successors, Ltd.....	628,000
Fred Stern & Co.....	55,466

APRIL 8.—By the <i>Malta</i> :	
Hagemeyer Trading Co.....	10,220
Fred Stern & Co.....	6,720

By the <i>Pennant</i> =London:	
J. T. Johnstone & Co.....	255,000

By the <i>Argentan</i> =London:	
Fred Stern & Co.....	11,200

By the <i>Pampa</i> =London:	
Fred Stern & Co.....	11,200

By the <i>Mississippi</i> =London:	
Fred Stern & Co.....	80,640

By the <i>Michigan</i> =London:	
Fred Stern & Co.....	181,440

AFRICANS.

APRIL.—By the <i>Balta</i> =Liverpool:	
Rubber Trading Co.....	22,240
Fred Stern & Co.....	11,200

APRIL.—By the <i>Chicago</i> =Bordeaux:	
Rubber Trading Co.....	11,200

MARCH 16.—By the <i>Marango</i> =Hull:	
Meyer & Brown.....	78,000

By the <i>Competitor</i> =Africa:	
Fred Stern & Co.....	291,200

MANICOBAS.

	POUNDS.
MARCH 10.—By the <i>Viola</i> =Bahia:	
Adolph Hirsch & Co.....	15,830

MARCH 11.—By the <i>Viola</i> =Bahia:	
Adolph Hirsch & Co.....	73,433

MARCH 17.—By the <i>Viola</i> =Bahia:	
Adolph Hirsch & Co.....	86,509

MARCH 31.—By the <i>Cuthbert</i> =Ceara:	
Adolph Hirsch & Co.....	33,151

APRIL 3.—By the <i>Sao Paulo</i> =Bahia:	
Adolph Hirsch & Co.....	27,644

GUAYULE.

MARCH 28.—By the <i>El Sol</i> =Laredo:	
Continental Rubber Co. of New York...	85,319

APRIL 11.—By the <i>El Sol</i> =Laredo:	
Continental Rubber Co. of New York...	50,739

APRIL 11.—By the <i>El Alba</i> =Eagle Pass:	
Continental Rubber Co. of New York...	25,362

APRIL 11.—By the <i>El Dai</i> =Eagle Pass:	
Continental Rubber Co. of New York...	22,500

APRIL 19.—By the <i>El Rojo</i> =Eagle Pass:	
Continental Rubber Co. of New York...	31,000

BALATA.

MARCH 26.—By the <i>Mayaro</i> =Ca Bolivar:	
Yglesias & Co., Inc.....	10,570

MARCH 30.—By the <i>Philadelphia</i> =Ca Bolivar:	
Yglesias & Co., Inc.....	5,454

APRIL 3.—By the <i>Maraval</i> =Ca Bolivar:	
Yglesias & Co., Inc.....	13,351

APRIL 6.—By the <i>Zulia</i> =Ca Bolivar:	
Yglesias & Co., Inc.....	28,544

RUBBER SCRAP.

MARCH 3.—By the <i>Alma</i> =London:	
Herman Weber.....	35,723

MARCH 15.—By the <i>Bovic</i> =Manchester:	
Herman Weber.....	78,947

MARCH 15.—By the <i>Ascania</i> =London:	
Herman Weber.....	32,939

MARCH 24.—By the <i>Ansonia</i> =London:	
Herman Weber.....	67,523

CRUDE RUBBER ARRIVALS AT SEATTLE.

PLANTATIONS.

TO SEATTLE.

	POUNDS.
MARCH 22.—By the <i>Salthybius</i> =Yokohama:	
The B. F. Goodrich Co.....	392,040
Aldens' Successors, Ltd.....	7,965
W. R. Grace & Co.....	2,295
The Goodyear Tire & Rubber Co.....	63,585
	465,885

MARCH 23.—By the <i>Hakkai Maru</i> =Kobe:	
Mitsui & Co., Ltd.....	100,980

APRIL 16.—By the <i>Caidigoushire</i> =Penang:	
The Goodyear Tire & Rubber Co.....	2,025

APRIL 18.—By the <i>Saikai Maru</i> =Singapore:	
The B. F. Goodrich Co.....	390,690
Hagemeyer Trading Co.....	34,155
Rubber Trading Co.....	4,860
East Asiatic Co.....	6,480
J. T. Johnstone & Co.....	3,240
	439,425

MARCH 21.—By the <i>Mitsuki Maru</i> =Kobe:	
Mitsui Bassan Kaisha.....	163,350

TO AKRON, OHIO.

MARCH 22.—By the <i>Talhybius</i> =Yokohama:	
J. T. Johnstone & Co.....	229,095
The Goodyear Tire & Rubber Co.....	93,420
	322,515

POUNDS.

MARCH 28.—By the <i>Manila Maru</i> =Yokohama:	
Firestone Tire & Rubber Co.....	112,050

APRIL 12.—By the <i>Bankoku Maru</i> =Singapore:	
The B. F. Goodrich Rubber Co.....	415,800

APRIL 16.—By the <i>Asper</i> =Hongkong:	
The B. F. Goodrich Rubber Co.....	384,210

The B. F. Goodrich Co.....	557,685
Goodyear Tire & Rubber Co....	270
	557,955

TO NEW YORK.

MARCH 22.—By the <i>Talhybius</i> =Yokohama:	
	POUNDS.

Henderson & Korn.....	26,000
United States Rubber Co.....	365,985
Hagemeyer Trading Co.....	33,615
Charles T. Wilson Co., Inc.....	96,930
L. Littlejohn & Co.....	114,345
J. T. Johnstone & Co.....	29,970
Edward Maurer & Co.....	75,330
Robinson & Co.....	7,560
Arnold & Zeiss.....	94,230
Fred Stern & Co.....	15,120
W. R. Grace & Co.....	44,450
East Asiatic Co.....	11,610
Meyer & Brown.....	81,000
Arthur Meyer & Co.....	28,890
W. H. Stiles & Co.....	80,325
E. G. Curry.....	25,245
L. M. Byles.....	11,205
Frank B. Ross & Co.....	26,730
	1,168,540

MARCH 28.—By the <i>Manila Maru</i> =Hongkong:	
Robert Badenhop Co., Inc.....	97,200

APRIL 12.—By the <i>Bankoku Maru</i> =Singapore:	
Rubber Tarding Co.....	1,755
Aldens' Successors, Ltd.....	29,295
Fred Stern & Co.....	14,580
Edward Maurer & Co., Inc.....	61,830
L. Littlejohn & Co.....	207,360
W. R. Grace & Co.....	3,240
Arthur Meyer & Co.....	3,510
	321,570

APRIL 16.—By the <i>Burma Maru</i> =Yokohama:	
Henderson & Korn.....	5,130
Charles T. Wilson Co., Inc.....	37,260
Robert Badenhop Co., Inc.....	170,235
W. H. Stiles & Co.....	27,945
Winter Son & Co.....	50,895
Raw Products Co.....	10,800
East Asiatic Co., Ltd.....	9,180
Robinson & Co.....	5,670
L. Littlejohn & Co.....	3,240
W. R. Grace & Co.....	2,025
	322,380

MARCH 21.—By the <i>Panama Maru</i> =Yokohama:	
L. Littlejohn & Co.....	21,330
Robinson & Co.....	5,670
Arnold & Zeiss.....	4,725
Fred Stern & Co.....	270
W. H. Stiles & Co.....	7,155
Edward Maurer & Co.....	27,945
	67,095

By the <i>Kippon Maru</i> =Far East:	
J. T. Johnstone & Co.....	255,000
By the <i>Siberia Maru</i> =Far East:	
J. T. Johnstone & Co.....	293,000
By the <i>Tenyo Maru</i> =Far East:	
J. T. Johnstone & Co.....	140,000
By the <i>Darien Maru</i> =Far East:	
J. T. Johnstone & Co.....	14,000
By the <i>Cyma Maru</i> =Far East:	
Fred Stern & Co.....	4,482
By the <i>Arakan</i> =Far East:	
J. T. Johnstone & Co.....	44,800
By the <i>Buitenzorg</i> =Far East:	
J. T. Johnstone & Co.....	205,000

TO WATERTOWN, MASS.

MARCH 22.—By the <i>Talhybius</i> =Yokohama:	
Various.....	55,080

APRIL 16.—By the	
Hood Rubber Co.....	64,800

TO DENVER, COLORADO.

MARCH 22.—By the <i>Talhybius</i> =Yokohama:	
J. T. Johnstone & Co.....	22,220

TO TORONTO, CANADA.

MARCH 22.—By the <i>Talhybius</i> =Yokohama:	
Various.....	84,240

GUTTA PERCHA.

TO SEATTLE.

APRIL 9.—By the <i>Tamba Maru</i> =Yokohama:	
Brardts Sons & Co.....	28,755
L. Littlejohn & Co.....	14,715
	43,470

APRIL 18.—By the <i>Saikai Maru</i> =Singapore:	
L. Littlejohn & Co.....	112,320

CRUDE RUBBER ARRIVALS AT
SAN FRANCISCO.

	POUNDS.
MARCH 1.—By the <i>Persia Maru</i> —Mamla:	
Mitsui & Co.....	260
MARCH 6.—By the <i>China Maru</i> —Hong Kong:	
United States Rubber Co.....	75,920
L. Littlejohn & Co.....	10,400
Various.....	4,150 127,270

MARCH 12.—By the <i>Korea Maru</i> —Hong Kong:	
Henderson & Korn.....	291,900
L. Littlejohn & Co.....	316,670
Meyer & Brown.....	37,780
Fred Stern & Co.....	9,607
Arnold & Zeiss.....	151,070
W. H. Stiles & Co.....	67,010
E. G. Curry.....	27,480 901,517

MARCH 12.—By the <i>Tjisondari</i> —Batavia:	
The B. F. Goodrich Rubber Co.	281,320
United States Rubber Co.....	25,220
The Goodyear Tire & Rubber Co.	111,150
L. Littlejohn & Co.....	68,510
John Edgar & Co.....	28,340 514,540

MARCH 24.—By the <i>Siberia Maru</i> —Hong Kong:	
Henderson & Korn.....	122,100
Rubber Trading Co.....	21,840
The Goodyear Tire & Rubber Co.	264,680
Arnold & Zeiss.....	237,380
L. Littlejohn & Co.....	80,860
Winter Son & Co.....	56,810
W. H. Stiles & Co.....	51,610
East Asiatic Co.....	43,680
E. G. Curry.....	21,840 900,800

MARCH 30.—By the <i>Venezuela Ex. Eucaliptus</i> —Singapore:	
Charles T. Wilson Co., Inc.....	51,740
Henderson & Korn.....	23,270
Hood Rubber Co.....	44,460
L. Littlejohn & Co.....	118,690
The Goodyear Tire & Rubber Co.	143,650
Fred Stern & Co.....	121,940
East Asiatic Co.....	42,250
Robinson & Co.....	36,660
Meyer & Brown.....	31,850 614,310

APRIL 2.—By the <i>Tenyo Maru Ex Salamis</i> —Singapore:	
J. T. Johnstone & Co.....	88,530

APRIL 6.—By the <i>Bankoku Maru</i> —Singapore:	
Meyer & Brown.....	49,000

APRIL 7.—By the <i>Saikai Maru</i> —Singapore:	
Meyer & Brown.....	112,000

APRIL 13.—By the <i>Kwanto Maru</i> —Kobe:	
Henderson & Korn.....	129,200

APRIL 22.—By the <i>Talkhybius</i> —Singapore:	
Meyer & Brown.....	108,000
J. T. Johnstone & Co.....	350,000

CUSTOM HOUSE STATISTICS.

PORT OF BOSTON—MARCH, 1917.		
IMPORTS:	POUNDS.	VALUE.
India rubber.....	33,358	\$9,983
Rubber scrap.....	11,442	1,062
Manufactures of india rubber.....		735
Totals.....	44,800	\$11,780
EXPORTS:		
Rubber scrap.....	160,951	\$17,479
India rubber boots.....pairs	8,038	19,047
India rubber shoes.....pairs	28,002	12,629
Automobile tires.....		442
Other tires.....		10
Belting, hose, etc.....		780
All other manufactures of india rubber.....		6,561
Totals.....		\$56,948

PORT OF CLEVELAND—MARCH, 1917.		
IMPORTS:	POUNDS.	VALUE.
India rubber.....	430,934	\$268,700
Manufactures of india rubber.....		223
Totals.....	430,934	\$268,923

PORT OF PHILADELPHIA—MARCH, 1917.		
IMPORTS:	POUNDS.	VALUE.
Manufactures of india rubber.....		\$603
EXPORTS:		
All other manufactures of india rubber.....		\$6,615

RUBBER STATISTICS FOR THE
UNITED STATES.IMPORTS OF CRUDE AND MANUFACTURED
RUBBER.

February, 1917.		
UNMANUFACTURED—free:	Pounds.	Value.
India rubber:		
From—		
France.....	85,759	\$46,773
Portugal.....	586,575	225,813
United Kingdom.....	4,024,038	2,565,716
Central American States and British Honduras...	203,143	92,174
Mexico.....	111,778	54,227
Brazil.....	3,983,966	1,771,253
Other South America.....	332,591	152,374
East Indies.....	9,948,445	5,672,606
Other countries.....	48,312	33,659
Totals.....	19,324,607	\$10,614,595
Latex.....	223,484	103,307
Guayule gum.....	157,539	42,118
*Gutta jelutong.....	1,519,602	66,331
Gutta percha.....	28,365	3,489
Totals.....	21,253,597	\$10,829,840
Rubber scrap.....	1,645,826	120,489
Totals unmanufactured.....	22,899,423	\$10,950,329
Chicle.....durable	772,733	384,679

February, 1917.		
MANUFACTURED—durable:	Pounds.	Value.
Gutta percha.....		\$27
India rubber.....		54,023
Total, manufactured....		\$54,050
Substitutes—elasticon, etc., durable		\$975

EXPORTS OF DOMESTIC
MERCHANDISE.

February, 1917.		
MANUFACTURED—	Pounds.	Value.
Automobile tires:		
To—		
France.....		\$60,455
Russia in Europe.....		43,680
England.....		186,436
Canada.....		101,437
Mexico.....		15,851
Cuba.....		72,331
Australia.....		62,653
New Zealand.....		5,734
Philippine Islands.....		20,340
Other countries.....		261,785
Total.....		\$830,702
All other tires.....		140,586
Belting, hose and packing....		245,719
Rubber boots.....pairs	40,297	96,500
Rubber shoes.....pairs	226,395	123,736
Scrap and old rubber.....	261,092	33,193
Reclaimed rubber.....	428,286	71,614
Other rubber manufactures..		622,575
Total, manufactured....		\$2,164,265
Fountain pens.....number	12,371	\$7,258

EXPORTS OF FOREIGN
MERCHANDISE.

February, 1917.		
UNMANUFACTURED—	Pounds.	Value.
India rubber.....	135,238	\$74,309
India rubber.....	737,736	404,887
Rubber scrap and refuse....		
Totals, unmanufactured..	872,974	\$479,196
Chicle.....	7,755	2,714
MANUFACTURED—		
India rubber.....		\$1,128
Total, manufactured....		\$1,128

EXPORTS OF RUBBER GOODS TO NON-CON-
TIGUOUS TERRITORIES OF THE UNITED
STATES.

February, 1917.		
MANUFACTURED—	Pounds.	Value.
To—		
Alaska:		
Belting, hose and packing....		\$5,931
Boots and shoes.....pairs	6,508	11,535
Other rubber goods.....		2,001
Total.....		\$19,467
Hawaii:		
Belting, hose and packing....		\$6,304
Automobile tires.....		27,875
Other tires.....		5,650
Other rubber goods.....		10,716
Total.....		\$50,545

February, 1917.		
MANUFACTURED—	Pounds.	Value.
To—		
Philippine Islands:		
Belting, hose and packing....		\$1,159
Boots and shoes.....pairs	3,533	2,151
Tires.....		27,116
Other rubber goods.....		17,830
Total.....		\$48,256

February, 1917.		
MANUFACTURED—	Pounds.	Value.
To—		
Porto Rico:		
Belting, hose and packing....		\$1,646
Automobile tires.....		41,656
Other tires.....		230
Other rubber goods.....		9,179
Total.....		\$52,711

*Dutiable beginning July 1, 1916.

IMPORTS OF CRUDE AND MANU-
FACTURED RUBBER AT THE
PORT OF NEW YORK.

March, 1917.		
UNMANUFACTURED—free:	Pounds.	Value.
Crude Rubber—		
France.....	88,050	\$46,491
Portugal.....	908,116	388,620
England.....	13,868,981	10,074,269
Costa Rica.....	14,289	8,052
Guatemala.....	17,409	8,826
Honduras.....	6,341	2,956
Nicaragua.....	42,935	21,685
Panama.....	22,282	7,130
Salvador.....	9,841	4,919
Mexico.....	301,959	114,053
Trinidad.....	879	371
British West Indies.....	11,221	8,786
Brazil.....	9,235,209	4,414,468
Colombia.....	134,943	55,356
Ecuador.....	86,765	37,539
British Guiana.....	3,590	1,486
Peru.....	49,837	25,577
Venezuela.....	4,314	2,616
Aden.....	958	479
British India.....	42,466	26,276
Straits Settlements.....	2,560,620	1,441,598
British East Indies.....	952,110	579,335
Dutch East Indies.....	2,027,911	1,126,636
Philippine Islands.....	1,667	804
Totals.....	30,392,693	\$18,398,328

Gutta jelutong—durable		
Straits Settlements.....	204,769	\$10,324
Dutch East Indies.....	143,394	4,791
Totals.....	348,163	\$15,115
Latex—free:		
Panama.....	119,051	\$50,088
Trinidad.....	1,000	500
Colombia.....	84,631	36,873
British Guiana.....	7,388	4,744
Dutch Guiana.....	22,907	12,515
Venezuela.....	70,651	33,669
Totals.....	305,628	\$138,389

Rubber Scrap—free:		
France.....	272,172	\$16,244
England.....	1,020,584	63,494
Panama.....	8,118	556
Mexico.....	6,309	447
Guatemala.....	5,803	522
Trinidad.....	1,784	107
British West Indies.....	1,110	67
Cuba.....	53,952	3,544
Argentina.....	188,523	11,874
Australia.....	41,439	1,366
Totals.....	1,599,794	\$98,221

Totals unmanufactured..	32,646,278	\$18,650,053
Chicle—durable:		
British Honduras.....	256,922	\$84,782
Canada.....	74,94	43,597
Mexico.....	111,537	38,836
Venezuela.....	101	23
Totals.....	443,474	\$167,238

February, 1917.		
MANUFACTURED—durable:	Pounds.	Value.
India Rubber—		
France.....		\$834
England.....		35,361
Scotland.....		964
Canada.....		5,666
Colombia.....		1,905
Straits Settlements.....		5,399
Total.....		\$50,129
Gutta Percha—		
Scotland.....		\$18,785
Totals, manufactured...		\$68,914

Official India Rubber Statistics for the United States.

For Year Ended June 30, 1916.

INDIA RUBBER.

IMPORTS OF CRUDE INDIA RUBBER BY COUNTRIES (FREE).

	Pounds.	Value.
Central American States—		
Guatemala	156,158	74,900
Honduras	122,061	60,636
Nicaragua	87,347	36,753
Panama	647,434	305,153
Salvador	234,336	89,292
Mexico	66,118	30,615
West Indies—	3,615,872	1,262,291
Haiti	5,311	2,139
Totals, North America	4,590,042	\$1,867,128
South America—		
Chile	221,593	114,854
Colombia	750,126	327,023
Venezuela	661,443	274,924
British—		
British India	16,392	7,041
Straits Settlements	101,668	41,212
Other British	3,476,294	1,702,581
Totals, South America	61,233,614	\$28,047,206

China	2,600	\$1,170
British—		
British India	136,071	74,883
Straits Settlements	78,891,429	47,022,914
Other British	26,212,604	16,314,772
Totals, Asia	125,695,456	\$75,195,129
Europe—		
United Kingdom—		
England	26,564	\$13,439
Scotland	7,760	\$6,661
Totals, 1915-16	267,775,557	\$155,044,790
Totals, 1914-15	172,068,428	83,030,269
Totals, 1913-14	131,995,742	71,219,851
Totals, 1912-13	113,384,359	90,170,316
Totals, 1911-12	110,210,173	93,013,255
Totals, 1910-11	72,046,260	76,244,603
Totals, 1909-10	101,044,681	101,078,825
Totals, 1908-09	88,359,895	61,709,723
Totals, 1907-08	62,233,160	36,613,185
Totals, 1906-07	76,963,838	58,919,981
Totals, 1905-06	57,844,345	45,114,450

IMPORTS OF CRUDE INDIA RUBBER BY CUSTOMS DISTRICTS (FREE).

At—	Pounds.	Value.
Massachusetts	1,222,169	\$755,893
New York	36,058,845	135,549,484
Philadelphia	10,582	18,227
Virginia	7,760	6,661
Florida	839	302
New Orleans	2,415,965	889,588
San Francisco	4,875,373	2,909,348
Southern California	10,182	2,399
Washington	15,147,721	10,475,081
Buffalo	2,340	1,148
Dakota	2,662,578	1,392,947
Ohio	5,364,683	3,043,700
St. Lawrence	20	
Totals, 1915-16	267,775,557	\$155,044,790

IMPORTS OF MANUFACTURES OF INDIA RUBBER, BY COUNTRIES (DUTIABLE).

	Value.
Austria-Hungary	366
Belgium	13,263
France	1,695
Germany	3,906
Italy	284
Netherlands	135
Portugal	10
Spain	46+
Sweden	9
Switzerland	41+
Totals, Europe	\$275,293
NORTH AMERICA:	
Canada	\$106,838+
United States	12
West Indies	492+
Dominican Republic	110+
Totals, North America	\$107,452
ASIA:	
China	85
Japan	13,618+
Totals, Asia	\$13,623

OCEANIA:	
Australia	\$14
New Zealand	35
Totals, Oceania	\$49
BRITISH SOUTH AFRICA	\$1,603
Totals, 1915-16	\$398,020
Totals, 1914-15	791,281
Totals, 1913-14	1,517,789
Totals, 1912-13	1,217,236
Totals, 1911-12	874,736
Totals, 1910-11	875,125
Totals, 1909-10	1,154,347
Totals, 1908-09	1,391,770
Totals, 1907-08	1,956,590
Totals, 1906-07	2,262,783
Totals, 1905-06	1,992,413

IMPORTS OF MANUFACTURES OF INDIA RUBBER, BY CUSTOMS DISTRICTS (DUTIABLE).

At—	Value.
Connecticut	\$20
Georgia	43
Maine and New Hampshire	413
Massachusetts	784
New York	43,295
Philadelphia	288,474
Porto Rico	7,466
Rhode Island	51
San Francisco	822
Virginia	587
Washington	23
New Orleans	67
St. Louis	12
Alaska	5
Hawaii	534
San Francisco	2,622
Southern California	2
Washington	1,544
Buffalo	511
Chicago	5,263
Dakota	85
Michigan	24,314
Montana and Idaho	384
Ohio	11,480
Rochester	239
St. Lawrence	492
Vermont	336
Washington	2,801
Buffalo	125
Massachusetts	794
Portland	2,522
St. Louis	1,910
Totals, 1915-16	\$398,020

RE-EXPORTS OF IMPORTED CRUDE INDIA RUBBER.

	Pounds.	Value.
France	23,693	\$14,690
Russia in Europe	289,219	147,567
United Kingdom—England	100,945	47,015
Canada	4,226,404	2,435,285
British Oceania—Australia	22,628	16,744
Totals, 1915-16	4,662,889	\$2,661,331
Totals, 1914-15	6,383,145	3,361,107
Totals, 1913-14	3,747,749	2,398,150
Totals, 1912-13	5,272,387	4,476,379
Totals, 1911-12	5,610,951	4,890,905
Totals, 1910-11	5,267,588	5,439,282
Totals, 1909-10	6,492,947	7,629,380
Totals, 1908-09	3,791,971	2,964,496
Totals, 1907-08	4,110,667	2,994,208
Totals, 1906-07	4,215,350	3,593,912

RE-EXPORTS OF MANUFACTURES OF INDIA RUBBER.

To—	Value.
United Kingdom—England	\$2,936
Canada	19,971
Mexico	14,693
Newfoundland and Labrador	95
West Indies	521
Colombia	70
Venezuela	53
Japan	310
Totals, 1915-16	\$38,649
Total, 1914-15	7,489
Total, 1913-14	7,638
Total, 1912-13	7,973
Total, 1911-12	6,681
Total, 1910-11	29,356
Total, 1909-10	13,568
Total, 1908-09	36,401
Total, 1907-08	176,129
Total, 1906-07	32,712

GUTTA PERCHA.

IMPORTS OF CRUDE GUTTA PERCHA, BY COUNTRIES (FREE).

From—	Pounds.	Value.
EUROPE:		
France	6,785	\$8,680
United Kingdom—		
England	56,419	11,972
Scotland	11,305	1,046
Totals, Europe	74,509	\$21,698
SOUTH AMERICA:		
Colombia	696	190

ASIA:		
British East Indies—		
Straits Settlements	2,984,984	\$299,150
Dutch East Indies	71,420	7,170
Siam	360	52
Totals, Asia	3,056,764	\$306,372

OCEANIA:		
Philippine Islands	16,384	\$4,744

AFRICA:		
British West Africa	40,096	\$9,222

Totals, 1915-16	3,188,449	\$342,226
Totals, 1914-15	1,618,214	230,750
Totals, 1913-14	1,846,109	323,567
Totals, 1912-13	480,853	167,313
Totals, 1911-12	1,204,406	225,797
Totals, 1910-11	1,648,921	390,548
Totals, 1909-10	784,501	167,873
Totals, 1908-09	255,559	82,136
Totals, 1907-08	188,610	100,305
Totals, 1906-07	546,890	201,339
Totals, 1905-06	500,770	188,161

IMPORTS OF CRUDE GUTTA PERCHA, BY CUSTOMS DISTRICTS (FREE).

At—	Pounds.	Value.
Massachusetts	555,625	\$53,268
New York	2,218,177	239,708
San Francisco	22,831	1,793
Washington	391,816	47,457
Totals	3,188,449	\$342,226

IMPORTS OF MANUFACTURES OF GUTTA PERCHA, BY COUNTRIES (DUTIABLE).

From—	Value.
EUROPE:	
United Kingdom—	
England	\$47,400
Scotland	\$7,797
Total, Europe	\$55,697

NORTH AMERICA:

Canada	\$128
Mexico	35
Totals, North America.....	\$163

ASIA:

Japan	\$1,015
Total, 1915-16.....	\$57,875
Total, 1914-15.....	\$10,841
Total, 1913-14.....	4,302
Total, 1912-13.....	77,300
Total, 1911-12.....	41,095
Total, 1910-11.....	61,283
Total, 1909-10.....	80,560
Total, 1908-09.....	71,819
Total, 1907-08.....	33,747

IMPORTS OF MANUFACTURED GUTTA PERCHA BY CUSTOMS DISTRICTS (DUTIABLE).

At—	Value.
Connecticut	\$69
Georgia	1
New York	55,853
Arizona	35
Hawaii	75
San Francisco	739
Southern California	130
Washington	318
Buffalo	70
Chicago	276
Duluth and Superior.....	10
Rochester	18
St. Lawrence	54
Vermont	34
Kentucky	188
Total	\$57,875

RE-EXPORTS OF CRUDE GUTTA PERCHA.

To—	Pounds.	Value.
Italy	814	\$569
United Kingdom—		
England	13,645	1,600
Canada	45,431	9,207
Argentina	193	70
Totals, 1915-16.....	60,268	\$11,446
Totals, 1914-15.....	9,457	4,603
Totals, 1913-14.....	14,649	5,255
Totals, 1912-13.....	22,332	2,665
Totals, 1911-12.....	1,001	945
Totals, 1910-11.....	62,391	19,235
Totals, 1909-10.....	74,137	13,886
Totals, 1908-09.....	9,370	3,730
Totals, 1907-08.....	5,000	700

RE-EXPORTS OF MANUFACTURES OF GUTTA PERCHA.

To—	Value.
Canada	\$30
Newfoundland and Labrador.....	25
West Indies—	
British, Jamaica.....	10
Cuba	297
British Oceania—	
New Zealand	166
Total, 1915-16.....	\$537
Total, 1914-15.....	—
Total, 1913-14.....	—
Total, 1912-13.....	65
Total, 1911-12.....	26,57

GUAYULE.

IMPORTS OF GUAYULE, BY COUNTRIES (FREE).

From—	Pounds.	Value.
Mexico	2,816,068	\$880,813
Totals, 1915-16.....	2,816,068	\$880,813
Totals, 1914-15.....	5,111,849	\$1,441,367
Totals, 1913-14.....	1,475,804	607,076
Totals, 1912-13.....	10,218,191	4,345,088
Totals, 1911-12.....	14,238,625	6,463,787
Totals, 1910-11.....	19,749,522	10,443,157

IMPORTS OF GUAYULE GUM, BY CUSTOMS DISTRICTS (FREE).

At—	Pounds.	Value.
Sabine	1,764	\$1,499
Eagle Pass.....	1,005,672	268,260
El Paso	1,472,791	425,912
Laredo	335,841	185,142
Totals	2,816,068	\$880,813

RE-EXPORTS OF GUAYULE GUM.

To—	Pounds.	Value.
Canada	18,500	\$7,770
Totals, 1915-16.....	18,500	\$7,770
Totals, 1914-15.....	29,891	\$8,901
Totals, 1913-14.....	56,399	22,378
Totals, 1912-13.....	83,769	54,669
Totals, 1911-12.....	197,948	98,517
Totals, 1910-11.....	340,405	175,995

GUTTA JELUTONG.

IMPORTS OF GUTTA JELUTONG (PONTIANAK) BY COUNTRIES (FREE).

From—	Pounds.	Value.
EUROPE:		
Netherlands	76,460	\$3,630
United Kingdom—		
England	22,745	1,593
Totals, Europe.....	99,205	\$5,223

ASIA:

British East Indies—		
Straits Settlements.....	25,596,455	\$1,223,101
Dutch East Indies.....	2,162,675	93,938
Totals, Asia	27,759,130	\$1,317,039

Totals, 1915-16.....	27,759,130	\$1,317,039
Totals, 1914-15.....	14,851,264	\$731,995
Totals, 1913-14.....	24,926,571	1,155,402
Totals, 1912-13.....	45,345,338	2,174,441
Totals, 1911-12.....	48,795,268	2,255,050
Totals, 1910-11.....	51,420,872	2,872,633
Totals, 1909-10.....	52,392,444	2,419,223
Totals, 1908-09.....	24,826,296	852,372
Totals, 1907-08.....	22,803,303	1,039,776
Totals, 1906-07.....	28,437,660	1,085,098
Totals, 1905-06.....	21,390,116	733,074
Totals, 1904-05.....	19,104,911	641,319
Totals, 1903-04.....	14,887,416	430,330
Totals, 1902-03.....	13,984,817	315,431
Totals, 1901-02.....	16,850,821	501,418
Totals, 1900-01.....	9,371,087	248,838
Totals, 1899-00.....	8,701,753	237,214
Totals, 1898-99.....	6,473,882	166,419

IMPORTS OF GUTTA JELUTONG (PONTIANAK) BY CUSTOMS DISTRICTS (FREE).

At—	Pounds.	Value.
Massachusetts	3,599,307	\$156,497
New York	18,055,160	834,442
San Francisco	15,712	11,897
Washington	6,008,616	319,426
Totals, 1915-16.....	27,858,335	\$1,322,262

RE-EXPORTS OF GUTTA JELUTONG (PONTIANAK).

To—	Pounds.	Value.
United Kingdom—		
England	58,611	\$2,807
West Indies—		
Cuba	162	18
Totals, 1915-16.....	58,773	\$2,825
Totals, 1914-15.....	—	—
Totals, 1913-14.....	32,000	8,000
Totals, 1912-13.....	3,000	163
Totals, 1911-12.....	118,486	6,079
Totals, 1910-11.....	—	—
Totals, 1909-10.....	2,139	112

BALATA.

IMPORTS OF BALATA, BY COUNTRIES (FREE).

From—	Pounds.	Value.
NORTH AMERICA:		
Central American States—		
Panama	1,117,852	\$363,293
West Indies—		
British—		
Jamaica	16,016	8,922
Trinidad and Tobago	16,569	10,107
Haiti	5,626	\$2,561
Totals, North America..	1,156,063	\$384,883
SOUTH AMERICA:		
Brazil	16,036	\$5,582
Colombia	106,727	39,206
Peru	1,500	1,850
Guatemala	—	—
British	238,565	121,532
Dutch	340,509	189,385
French	42,501	18,600
Venezuela	639,504	235,064
Totals, South America..	1,388,342	\$611,219
Totals, 1915-16.....	2,544,405	\$996,102
Totals, 1914-15.....	2,472,224	963,384

Totals, 1913-14.....	Pounds.	Value.
Totals, 1912-13.....	1,533,024	793,126
Totals, 1911-12.....	1,318,598	766,772
Totals, 1910-11.....	1,517,066	984,012
Totals, 1909-10.....	878,305	624,702
Totals, 1908-09.....	399,003	196,878
Totals, 1907-08.....	1,157,018	522,872
Totals, 1906-07.....	584,582	276,756
Totals, 1905-06.....	799,029	305,041
Totals, 1904-05.....	374,220	152,689

IMPORTS OF BALATA, BY CUSTOMS DISTRICTS (FREE).

At—	Pounds.	Value.
New York	2,544,405	\$996,102

RE-EXPORTS OF BALATA.

To—	Pounds.	Value.
United Kingdom—		
England	1,612	1,010
Canada	—	—
Central American States—		
Panama	—	—
British Oceania—		
Australia	4,390	3,293
Totals, 1915-16.....	667,168	\$245,329
Totals, 1914-15.....	1,076,619	\$426,735
Totals, 1913-14.....	223,983	127,139
Totals, 1912-13.....	118,334	77,963
Totals, 1911-12.....	62,529	38,423
Totals, 1910-11.....	264,589	230,575
Totals, 1909-10.....	—	42,750
Totals, 1908-09.....	—	223,907
Totals, 1907-08.....	—	18,741
Totals, 1906-07.....	—	12,659

SCRAP RUBBER.

IMPORTS OF SCRAP AND REFUSE RUBBER BY COUNTRIES (FREE).

From—	Pounds.	Value.
EUROPE:		
Denmark	42,814	\$3,040
France	281,519	40,598
Germany	250	51
Greece	44,240	3,991
Italy	463,742	94,534
Norway	520,519	45,792
Sweden	85,147	6,346
United Kingdom—		
England	6,424,308	528,962
Scotland	5,609	134
Totals, Europe.....	7,868,148	\$723,428

NORTH AMERICA:

Costa Rica.....	7,627,485	\$506,443
Central American States—		
Costa Rica.....	134	—
Panama	79,312	3,868
Mexico	83,570	4,598

WEST INDIES—

British—		
Jamaica	11,462	638
Cuba	—	20,806
Danish	150	30
Dominican Republic...	6,482	318

Totals, North America..	8,197,177	\$536,709
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SOUTH AMERICA:

Brazil	104,002	\$3,791
Venezuela	7,307	284

Totals, South America..	—	\$4,075
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ASIA:

China	18,470	\$716
Hongkong	87,895	2,814
Japan	7,314	401
Totals, Asia	113,679	\$3,931

OCEANIA:

British—		
Australia	1,800	\$50
New Zealand	79,420	3,707
French	40	3

Totals, Oceania.....	81,260	\$3,760
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Totals, 1915-16.....	16,371,573	\$1,271,903
Totals, 1914-15.....	11,006,938	726,915
Totals, 1913-14.....	25,958,261	2,063,198
Totals, 1912-13.....	43,385,456	3,709,238
Totals, 1911-12.....	26,293,192	2,095,605
Totals, 1910-11.....	26,948,000	2,334,870
Totals, 1909-10.....	37,364,671	2,899,997
Totals, 1908-09.....	20,497,695	1,543,267
Totals, 1907-08.....	16,331,035	1,496,822
Totals, 1906-07.....	29,335,193	2,608,987

IMPORTS OF SCRAP AND REFUSE RUBBER BY CUSTOMS DISTRICTS (FREE).

At—	Pounds.	Value.
Maine and N. H.....	794,469	\$67,239
Maryland	1,541,797	178,812
Massachusetts	674,137	54,018
New York	6,482,423	532,153
Philadelphia	144,043	10,654

	Pounds.	Value.
Ala.	1,901	131
Cal.	1,543	42
Ariz.	300	15
Tex.	85,406	4,403
W. Va.	2,100,8	12,273
Ind.	2,437,123	157,292
Chicago	556,512	32,160
St. Louis	200,787	9,864
Mo.	386,731	29,272
Ohio	60,464	418
St.	70,000	38,363
Vermont	1,978,883	138,450
St. Louis	110,784	6,344
Totals, 1915-16.....	16,371,573	\$1,271,903

EXPORTS OF SCRAP AND REFUSE RUBBER BY CUSTOMS DISTRICTS.		
From—	Pounds.	Value.
Maine and New Hampshire	7,145	\$4,905
Maryland	40,965	3,300
Massachusetts	62,065	7,943
New York	2,303,630	305,682
Philadelphia	12,031	1,950
San Francisco	92,030	11,743
Buffalo	450,922	28,908
Michigan	292,493	18,150
St. Lawrence	23,935	556
Vermont	618,899	16,953
Totals, 1915-16.....	3,904,715	\$400,148

OCEANIA:		
Australia	Pounds.	Value.
	45,203	\$5,097
Totals, 1915-16.....	6,406,946	\$871,262
Totals, 1914-15.....	5,970,380	822,561
Totals, 1913-14.....	5,583,860	834,440
Totals, 1912-13.....	5,413,247	932,904
Totals, 1911-12.....	5,397,806	875,501
Totals, 1910-11.....	4,994,527	781,650
Totals, 1909-10.....	3,622,556	535,795
Totals, 1908-09.....	3,196,551	414,861
Totals, 1907-08.....	2,947,974	418,738
Totals, 1906-07.....	4,550,788	665,109
Totals, 1905-06.....	4,084,696	511,843
Totals, 1904-05.....	a	522,902

(a) Not officially reported.

EXPORTS OF SCRAP AND REFUSE RUBBER BY COUNTRIES.

	Pounds.	Value.
France	83,119	\$1,444
Sweden	45,079	10,204
United Kingdom—		
England	1,362,622	181,522
Scotland	835,524	105,914
Totals, Europe	2,326,344	\$310,134

NORTH AMERICA:		
Canada	1,393,550	\$69,502
Central American States—		
Panama	190	22
Salvador	279	17
Mexico	600	88
West Indies—		
Cuba	25,004	2,775
Porto Rico	1,000	10
Totals, North America..	1,419,703	\$13,338

SOUTH AMERICA:		
Brazil	4,000	\$470
Argentina	1,000	10
Chile	1,000	10
Colombia	1,000	10
Costa Rica	1,000	10
Cuba	1,000	10
Guatemala	1,000	10
Honduras	1,000	10
El Salvador	1,000	10
Nicaragua	1,000	10
Panama	1,000	10
Paraguay	1,000	10
Peru	1,000	10
Uruguay	1,000	10
Venezuela	1,000	10
Totals, South America..	1,419,703	\$13,338

ASIA:		
British India	1,000	\$1,711
British India	1,000	14,981
Totals, Asia.....	154,668	\$16,325
Totals, 1915-16.....	3,904,715	\$400,148
Totals, 1914-15.....	2,422,091	291,421
Totals, 1913-14.....	6,207,672	598,287
Totals, 1912-13.....	7,269,465	880,442
Totals, 1911-12.....	7,336,984	780,188
Totals, 1910-11.....	7,049,729	723,664
Totals, 1909-10.....	6,143,610	578,944
Totals, 1908-09.....	6,071,795	402,807
Totals, 1907-08.....	4,255,789	449,727
Totals, 1906-07.....	4,756,621	548,695
Totals, 1905-06.....	a	339,507
Totals, 1904-05.....	a	204,945

EUROPE:		
France	3,000	\$317
Germany	343,466	42,965
Italy	524	83
United Kingdom	852,091	127,757
Scotland	126,065	19,788
Totals, Europe.....	1,325,146	\$190,910
NORTH AMERICA:		
Canada	4,921,584	\$659,589
Mexico	1,224	152
West Indies—		
British—Barbados	200	54
Cuba	723	159
Totals, North America..	4,923,731	\$659,954
SOUTH AMERICA:		
Argentina	28,147	4,642
Totals, South America..	28,147	4,642
ASIA:		
British India	84,719	\$10,659
Totals, Asia.....	84,719	\$10,659

(a) Not officially reported.

RE-EXPORTS OF SCRAP RUBBER.

	Pounds.	Value.
Totals, 1915-16.....	9,204	\$734
Totals, 1914-15.....	373	373
Totals, 1913-14.....	24,295	2,450
Totals, 1912-13.....	87,930	10,723
Totals, 1911-12.....	302,105	28,196
Totals, 1910-11.....	401,231	43,338
Totals, 1909-10.....	61,395	5,373
Totals, 1908-09.....	38,506	2,093
Totals, 1907-08.....	21,713	2,943
Totals, 1906-07.....	105,463	9,444

RECLAIMED RUBBER.

EXPORTS OF RECLAIMED RUBBER BY COUNTRIES.		
To—	Pounds.	Value.
EUROPE:		
France	3,000	\$317
Germany	343,466	42,965
Italy	524	83
United Kingdom	852,091	127,757
Scotland	126,065	19,788
Totals, Europe.....	1,325,146	\$190,910
NORTH AMERICA:		
Canada	4,921,584	\$659,589
Mexico	1,224	152
West Indies—		
British—Barbados	200	54
Cuba	723	159
Totals, North America..	4,923,731	\$659,954
SOUTH AMERICA:		
Argentina	28,147	4,642
Totals, South America..	28,147	4,642
ASIA:		
British India	84,719	\$10,659
Totals, Asia.....	84,719	\$10,659

EXPORTS OF RECLAIMED RUBBER BY CUSTOMS DISTRICTS.

From—	Pounds.	Value.
Massachusetts	123,125	\$19,200
New York	1,317,034	187,376
San Francisco	45,203	5,097
Buffalo	1,645,343	223,624
Michigan	308,829	38,111
Ohio	85,425	6,012
St. Lawrence	443,499	63,097
Vermont	2,438,488	328,745
Totals	6,406,946	\$871,262

SUBSTITUTES, ELASTICON, ETC.

IMPORTS OF ELASTICON AND SIMILAR SUBSTITUTES FOR INDIA RUBBER BY COUNTRIES (DUTIABLE).

From—	Value.
EUROPE:	
France	\$92
Germany	38
England	15,860
Total, Europe	\$15,990
ASIA:	
Japan	\$189
Total, 1915-16.....	\$16,179
Total, 1914-15.....	30,349
Total, 1913-14.....	87,642
Total, 1912-13.....	97,452
Total, 1911-12.....	87,328
Total, 1910-11.....	115,601
Total, 1909-10.....	114,516
Total, 1908-09.....	60,625
Total, 1907-08.....	27,000

IMPORTS OF ELASTICON AND SIMILAR SUBSTITUTES FOR INDIA RUBBER BY CUSTOMS DISTRICTS (DUTIABLE).

At—	Value.
Massachusetts	\$3,153
New York	13,026
Total, 1915-16.....	\$16,179

EXPORTS OF AMERICAN RUBBER GOODS, FISCAL YEAR ENDED JUNE 30, 1916. (BY CUSTOMS DISTRICTS.)

EXPORTED FROM—	Belting, Hoses and Packing. Value.	Boots.		Shoes.		Tires.		Other Goods Value.	Total Value.
		Pairs.	Value.	Pairs.	Value.	Automobile Value.	Other Value.		
Georgia	\$295					\$147			\$442
Maine and New Hampshire	5,997	3,470	\$8,904	2,213	\$1,773	1,758	\$564	\$22,914	41,910
Maryland	14,444					189,476	625	4,947	209,492
Massachusetts	205,256	276,274	587,046	852,955	363,890	1,329,907	819	739,632	3,226,550
New York	1,967,531	392,836	890,194	982,593	573,148	11,442,571	2,779,134	4,629,048	22,281,626
Philadelphia	52,699					331,336	374	82,353	466,762
Porto Rico	10					459	14	46	530
Rhode Island	12,373						3		3
Virginia	2,506	4	331			686,517	17,695	20,172	736,988
Florida	1,259	1	4			21,994		1,026	25,963
Galveston	1,259					1,186		362	2,807
Mobile	1,259					3,451			3,533
New Orleans	19,174	73	53	1,034	873	11,125	998	11,458	43,681
Sabine	1,388					727		151	2,266
Arizona	33,590	26	137	371	266	10,308	783	5,579	50,663
Eagle Pass	2,417					5,378	225	652	8,672
El Paso	18,476					10,365	365	3,310	32,546
Laredo	21,780					50,885	2,902	2,597	77,811
Alaska	15,582					3,176	18	572	33,730
Hawaii						98		8	106
Oregon						450			450
San Francisco	300,709	3,393	14,019	52,638	43,586	1,857,589	165,202	167,592	2,548,697
Southern California	1,682	3	15	82	28	8,401		604	10,730
Washington	54,431	1,414	6,142	24,721	19,418	189,991	7,633	89,375	366,990
Buffalo	113,116	3,175	8,447	2,723	1,365	406,926	16,051	678,199	1,224,004
Duluth	3,380	3,490	10,123	2,971	2,033	657,701	546	72,671	781,354
Duluth and Superior	9,240	7	31	960	1,691	3,487	835	25,937	41,221
Michigan	20,961	25,640	62,892	4,245	5,259	583,227	6,843	82,936	762,118
Montana and Idaho	690	2	6	15	12	883		1,254	2,845
Ohio	5							137	152
Rochester	130								130
St. Lawrence	43,362	142	580	60	32	113,683	1,381	223,048	382,086
Vermont	30,659	7,108	18,907	47,274	29,313	12,995	67	423,765	515,106
Totals	\$2,986,953	720,130	\$1,619,260	1,976,896	\$1,046,102	\$17,936,227	\$3,003,077	\$7,290,345	\$33,881,964

EXPORTS OF AMERICAN RUBBER GOODS, FISCAL YEAR ENDED JUNE 30, 1916. (BY COUNTRIES.)

EXPORTED TO—	Belting, Hoses and Packing. Value.	Boots.		Shoes.		Tires.		Other Goods Value.	Total Value.
		Pairs.	Value.	Pairs.	Value.	Automobile Value.	Other Value.		
Austria-Hungary.....	.....	.....	.....	.....	.....	.....	.....	\$36	\$36
Azores and Madeira Islands.....	\$29	.....	.....	.....	.....	\$373	.....	859	1,261
Denmark.....	2,407	.....	.....	6,801	\$4,044	16,089	\$12,093	12,787	47,820
Finland.....	676	.....	.....	.....	.....	.....	.....	43	1,019
France.....	35,746	60,418	\$132,203	148,585	71,448	80,423	163,818	522,757	1,006,395
Germany.....	.....	.....	.....	.....	.....	.....	.....	120	120
Gibraltar.....	.....	.....	.....	.....	.....	.....	.....	48	48
Greece.....	6,278	.....	.....	.....	.....	698	1,018	4,880	13,874
Iceland and Faroe Islands.....	.....	.....	.....	.....	.....	.....	.....	106	106
Italy.....	11,555	1,131	2,496	46,993	30,935	333,437	411,666	118,922	909,011
Netherlands.....	4,503	.....	.....	4,509	1,768	36,548	10,851	27,890	81,650
Norway.....	10,700	.....	.....	74,139	35,200	10,001	11,672	12,089	79,212
Portugal.....	2,207	20	63	.....	.....	25,990	.....	4,267	33,457
Roumania.....	.....	.....	.....	.....	.....	576	.....	900	1,476
Russia in Europe.....	4,845	.....	.....	.....	.....	1,125,733	28,313	20,416	1,179,307
Spain.....	113	643	1,897	.....	.....	32,984	5,946	25,350	66,290
Sweden.....	4,164	.....	.....	75	303	35,850	23,235	19,018	82,570
Switzerland.....	.....	.....	.....	8,762	3,466	.....	.....	2,815	6,281
United Kingdom—									
England.....	814,900	569,907	1,248,116	1,068,429	527,452	9,175,248	1,306,699	3,165,609	16,238,024
Scotland.....	37,757	96	161	57,565	20,473	116,858	15,331	31,771	222,351
Ireland.....	.....	.....	.....	.....	.....	1,376	.....	567	1,943
Totals, Europe.....	\$936,220	632,215	\$1,384,936	1,415,939	\$695,089	\$10,992,184	\$1,991,572	\$3,971,250	\$19,971,251
NORTH AMERICA:									
Bermuda.....	\$682	.....	.....	1,355	\$797	\$1,440	\$1,364	\$2,693	\$6,976
British Honduras.....	468	65	\$26	523	432	36	64	1,225	2,251
Canada.....	279,342	32,842	91,601	34,729	26,458	1,176,836	30,487	1,553,094	3,157,818
Central American States—									
Costa Rica.....	5,655	.....	.....	40	24	6,068	3,832	6,076	21,605
Guatemala.....	4,544	.....	.....	250	117	6,299	2,553	6,411	19,924
Honduras.....	7,612	.....	.....	386	313	7,932	2,624	8,229	26,710
Nicaragua.....	6,330	18	55	162	80	157	20	8,741	18,391
Panama.....	116,083	952	2,621	15,287	8,900	73,854	9,504	45,387	256,439
Salvador.....	12,754	.....	.....	96	94	11,673	3,205	20,367	48,093
Mexico.....	193,470	145	473	1,366	895	236,811	33,696	61,082	526,427
Miquelon, Langley, etc.....	40	1,683	3,985	2,890	1,303	.....	.....	185	5,513
Newfoundland and Labrador.....	5,171	23,436	54,716	86,681	60,415	5,108	4,118	21,252	150,730
West Indies—British—									
Barbados.....	331	.....	.....	36	55	6,019	1,121	3,691	11,217
Jamaica.....	8,840	10	22	434	220	40,354	19,380	6,795	75,620
Trinidad and Tobago.....	7,192	.....	.....	448	169	30,510	5,235	7,482	50,588
Other British.....	2,700	.....	.....	1,249	819	8,337	2,500	3,127	17,383
Cuba.....	171,456	692	1,346	16,425	11,691	547,410	139,892	336,483	1,208,278
Danish.....	362	.....	.....	82	74	1,099	80	623	2,238
Dominican Republic.....	7,150	26	71	672	420	18,223	4,630	10,587	41,120
Dutch.....	2,400	.....	.....	62	38	4,437	386	878	8,139
French.....	134	1	4	17	14	1,283	388	916	2,739
Haiti.....	1,575	1	3	45	37	988	664	2,707	5,974
Totals, North America.....	\$837,147	59,878	\$154,923	163,234	\$113,365	\$2,184,874	\$265,833	\$2,108,031	\$5,664,173
SOUTH AMERICA:									
Argentina.....	\$74,666	206	\$194	7,201	\$4,266	\$488,329	\$97,703	\$206,315	\$871,863
Bolivia.....	4,568	.....	.....	.....	.....	4,954	17	16,417	25,956
Brazil.....	67,359	366	1,242	25,535	13,154	295,479	113,753	199,889	690,156
Chile.....	175,879	4,077	9,410	19,534	11,036	88,600	34,751	73,631	363,516
Colombia.....	10,612	17	43	2,283	1,175	28,617	7,614	27,157	75,218
Ecuador.....	6,714	84	243	1,135	451	9,225	3,486	8,594	28,213
Guiana—									
British.....	2,574	.....	.....	4,906	2,057	5,512	1,305	1,800	13,277
Dutch.....	1,155	.....	.....	276	132	1,339	371	908	3,905
French.....	143	.....	.....	96	68	14	.....	.....	225
Paraguay.....	.....	.....	.....	.....	.....	.....	.....	44	44
Peru.....	38,871	1,428	4,754	360	3	9,663	2,082	19,224	74,819
Uruguay.....	11,995	80	147	13,942	7,605	76,608	26,217	34,923	157,495
Venezuela.....	8,716	.....	.....	570	312	71,849	7,207	27,960	116,044
Totals, South America.....	\$402,732	6,258	\$16,333	75,838	\$40,461	\$1,050,398	\$293,916	\$616,891	\$2,420,731
ASIA:									
Aden.....	.....	.....	.....	.....	.....	\$1,585	.....	.....	\$1,585
China.....	\$16,670	205	\$640	2,413	\$1,827	41,298	\$5,385	\$16,991	82,820
China, leased territories—									
French.....	.....	.....	.....	.....	.....	999	.....	4	1,003
Japanese.....	96	.....	.....	.....	.....	.....	.....	.....	96
Chosen.....	5,161	4	29	132	129	4,330	.....	219	9,868
East Indies—British—									
British India.....	4,818	370	830	530	635	119,242	21,180	27,854	174,559
Straits Settlements.....	2,739	.....	.....	1,248	628	63,572	1,498	3,551	71,988
Other British.....	660	.....	.....	70	83	19,012	312	474	20,541
East Indies—Dutch.....	8,320	290	620	930	655	201,287	20,756	28,962	260,600
Hongkong.....	5,032	26	75	964	1,816	4,189	2,058	3,943	17,113
Japan.....	99,734	1,147	2,325	28,763	19,456	20,045	2,478	106,188	250,226
Russia in Asia.....	20,351	326	1,631	274	331	100	.....	5,640	28,053
Siam.....	.....	.....	.....	.....	.....	2,236	239	622	3,097
Totals, Asia.....	\$163,581	2,368	\$6,159	35,324	\$25,560	\$477,895	\$53,906	\$194,448	\$921,549
OCEANIA:									
British Oceania—									
Australia.....	\$140,715	7,071	\$19,884	175,529	\$88,296	\$1,551,154	\$81,736	\$147,453	\$2,029,238
New Zealand.....	39,447	9,609	29,048	18,237	13,460	944,008	49,223	86,223	1,161,409
Other British.....	.....	7	42	5,148	4,946	574	.....	57	5,619
French Oceania.....	1,941	.....	.....	9,199	7,318	8,990	1,163	971	20,383
German Oceania.....	143	.....	.....	.....	.....	41	136	14	334
Philippine Islands.....	57,686	451	1,226	67,264	49,323	391,634	146,777	103,662	750,308
Totals, Oceania.....	\$239,932	17,138	\$50,200	275,369	\$163,343	\$2,896,401	\$279,035	\$338,380	\$3,967,291

THE INDIA RUBBER WORLD

[MAY 1, 1917.]

EXPORTED TO—	Belting, Packing, Value.	Boots.		Shoes.		Tires.		Other Goods, Value.	Total Value.
		Pairs.	Value.	Pairs.	Value.	Automobile, Value.	Other, Value.		
Belgian Congo						\$17	\$15	\$313	\$345
Portugal									
W. Africa	\$1,132			224	\$334	27,301	678	116	29,461
S. Africa	1,143	2,153	\$6,275	10,968	8,050	291,318	116,391	56,420	855,339
Canary Islands ...						9,732			10,875
French Africa						1,777		144	2,027
M. Africa							1,474	1,095	3,320
M. Asia							95		95
M. Europe						197			197
Spanish Africa ...	27,939						79	3,243	35,217
TOTALS, 1915-16			\$6,709	11,192	\$8,284	\$334,475	\$118,815	\$61,345	\$46,969
Grand totals, 1915-16	\$2,986,953	720,130	\$1,619,260	1,976,896	\$1,046,102	\$17,936,227	\$3,003,077	\$7,290,345	\$33,881,964
Grand totals, 1914-15	1,807,848	318,727	726,765	2,219,900	2,053,560	4,963,270	576,602	3,525,486	13,653,531
Grand totals, 1913-14	2,372,887	101,361	279,206	1,634,258	834,289	3,505,267	563,372	3,453,472	11,008,493
Grand totals, 1912-13	2,605,551	109,528	274,330	2,231,467	1,163,953	3,943,220	611,458	3,913,036	12,511,548
Boots and Shoes									
		Pairs.	Value.						
Grand totals, 1911-12	\$2,315,484	2,545,076	\$1,502,890			2,657,809	546,833	4,144,273	11,167,289
Grand totals, 1910-11	2,163,416	3,984,332	2,219,430			2,085,107	592,470	3,886,825	10,947,248
Grand totals, 1909-10	1,960,825	3,791,084	1,984,739					5,115,331	9,060,895
Grand totals, 1908-09	1,807,848	2,396,435	1,292,673					3,823,956	6,615,074
Grand totals, 1907-08	1,347,775	3,080,253	1,614,290					3,743,040	6,705,105
Grand totals, 1906-07	1,253,369	2,310,420	1,231,898					3,729,643	6,214,910
Grand totals, 1905-06	1,177,775	2,693,690	1,505,082					2,966,144	5,692,385
Grand totals, 1904-05	994,100	2,390,539	1,214,342					2,572,375	4,780,817
Grand totals, 1903-04	880,000	2,310,420	1,231,898					3,729,643	6,214,910
Grand totals, 1902-03	817,775	2,307,401	1,056,491					2,299,875	4,176,351
Grand totals, 1901-02	634,146	2,594,708	1,046,315					1,781,941	3,462,402
Grand totals, 1900-01	565,726	1,459,100	724,015					1,727,527	3,017,268

¹ Stated separately after 1912. ² Tires were not specifically reported before 1910-11.

SUMMARY.

	1915-16.		1914-15.		1913-14.	
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
IMPORTS OF FOREIGN MERCHANDISE						
India rubber, etc., and substitutes for, and manufactures of:						
Unmanufactured—						
Balata	1,533,024	\$793,126	2,472,224	\$963,384	2,544,405	\$996,102
Gutta percha	1,475,804	607,076	5,111,849	1,441,367	2,816,068	880,813
Gutta jelutong	24,926,571	1,155,402	14,881,264	731,995	27,858,335	1,322,262
Gutta	1,846,109	323,567	1,618,214	230,750	3,188,449	342,226
India rubber	131,995,742	71,219,851	172,068,428	83,030,269	267,775,557	155,044,790
India rubber scrap or refuse, fit only for remanufacture	25,958,261	2,063,198	11,006,928	726,915	16,371,573	1,271,903
Total unmanufactured imports	187,735,511	\$76,162,220	207,128,907	\$87,124,680	320,554,387	\$159,858,096
Manufactures of—						
Gutta percha		\$42,023		\$10,841		\$57,875
India rubber		1,517,789		791,281		398,020
Substitutes, elasticon and similar		87,642		30,349		16,179
Total manufactured imports		\$1,647,454		\$832,471		\$472,074
RE-EXPORTS OF FOREIGN MERCHANDISE—						
India rubber, etc., and substitutes for, and manufactures of:						
Unmanufactured—(free):						
Balata	223,983	\$127,139	1,076,619	\$426,735	667,168	\$245,329
Gutta percha	56,399	22,378	29,891	8,901	18,500	7,770
Gutta jelutong	32,330	2,195			58,773	2,825
Gutta	14,319	5,060	9,457	4,603	60,023	11,446
India rubber	3,747,749	2,398,150	6,383,145	3,361,107	4,662,889	2,661,301
India rubber scrap or refuse, fit only for remanufacture	24,316	2,450	3,483	373	9,204	734
Total unmanufactured re-exports	4,099,096	\$2,557,372	7,502,595	\$3,801,719	5,476,557	\$2,929,405
Manufactures of—						
Gutta percha						\$537
India rubber		\$7,638		\$7,489		38,649
Substitutes, elasticon and similar				364		
Total manufactures re-exported		\$7,638		\$7,853		\$39,186
EXPORTS OF DOMESTIC MANUFACTURES—						
India rubber, manufactures of:						
Scrap and old	6,207,672	\$598,287	2,422,091	\$291,421	3,904,715	\$400,148
Reclaimed	5,583,860	834,440	5,970,380	822,561	6,406,946	871,262
Belting, hose and packing		2,372,887		1,807,848		2,986,953
Boots and shoes—						
Boots	101,361	279,206	318,727	726,765	720,130	1,619,260
Shoes	1,634,258	834,289	2,219,900	2,053,560	1,976,696	1,046,102
Tires—						
For automobiles		3,505,267		4,963,270		17,936,227
All other		563,372		576,602		3,003,077
All other manufactures of		3,453,472		3,525,486		7,290,345
Total domestic manufactures exported		\$12,441,220		\$14,767,513		\$35,180,096

RUBBER STATISTICS FOR THE UNITED STATES.

FOR QUARTER ENDING SEPTEMBER 30, 1916.

UNMANUFACTURED—data by

IMPORTS OF CRUDE AND MANUFACTURED RUBBER.

July 1 to Sept. 30, 1916.

UNMANUFACTURED—free:	Pounds.	Value.
Balata, crude	582,273	\$271,531
Guayule gum	153,475	100,310
Gutta percha, crude	1,027,055	144,376
India rubber, crude	51,612,637	28,387,499
Scrap rubber	2,571,212	174,091
Reclaim rubber		87,952
Totals	56,648,295	\$29,175,739

Gutta jelutong	6,001,834	302,532
Totals, unmanufactured	63,850,129	\$29,478,271
MANUFACTURED—data by		
Gutta percha	10 per cent	\$105,218
India rubber	25 per cent	105,380
Druggists' sundries	15 per cent	8,947
Hard rubber	25 per cent	3,817
Substitutes, elasticon, etc.	15 per cent	8,788
Totals manufactured		\$232,170

EXPORTS OF INDIA RUBBER FROM MANAOS DURING FEBRUARY, 1917.

NEW YORK.

EUROPE.

EXPORTERS.	Fine.	Medium.	Coarse.	Caucho.	Totals.	Fine.	Medium.	Coarse.	Caucho.	Totals.	Grand Totals.
General Rubber Co. of Brazil	35,761	76,454	187,400	523,000	80,205	8,640	10,055	130,000	653,000	653,000	653,000
Tancredito Porto & Co.	67,095	78,311	31,019	329,900	151,269	10,258	1,477	40,738	203,742	533,642	533,642
Adelbert H. Alden, Limited.	2,438	63,208	91	103,014	275,080	119	167	68,755	344,121	447,135	447,135
Stowell & Co.	49,979	56,282	209,662	78,479	6,730	1,438	47,614	134,261	343,923	343,923	343,923
J. G. Araujo	184,569	14,874	71,352	10,632	281,427	46,240	160	11,320	58,920	340,347	340,347
Ohlinger & Co.	21,027	1,120	23,009	50,145	20,985				50,145	50,145	50,145
H. B. Böhme				20,985	10,087				20,985	20,985	20,985
J. L. Traque				10,087	10,030				10,087	10,087	10,087
W. Peters	3,020	5,340	1,370	10,030	7,626	932	610	300	9,468	9,468	9,468
B. Levy & Co.					4,923	466	2,165	550	8,104	8,104	8,104
Thos. Levy Camille & Co.							665		1,030	1,030	1,030
Mesquita & Co.											
In transit, Iquitos	711,489	165,147	351,814	309,803	1,538,250	643,822	27,590	17,942	200,292	889,646	2,427,896
Totals, February, 1917	839,239	175,801	411,945	427,365	1,854,350	643,822	27,590	17,942	200,292	889,646	2,743,996
Totals, January, 1917	626,826	48,803	24,379	156,331	856,339	434,482	79,139	177,199	130,568	821,388	1,677,727

EXPORTS OF INDIA RUBBER FROM MANAOS DURING MARCH, 1917.

NEW YORK.

EUROPE.

EXPORTERS.	Fine.	Medium.	Coarse.	Caucho.	Totals.	Fine.	Medium.	Coarse.	Caucho.	Totals.	Grand Totals.
General Rubber Co. of Brazil	48,038	5,386	6,830	172,746	287,000	191,479	45,671	7,646	84,204	329,000	616,000
Tancredito Porto & Co.	163,309	12,028	48,141	80,622	304,100	80,551	732	399	44,576	126,258	430,358
Stowell & Co.	28,623	2,164	23,766	139,726	194,279	132,400	9,212	4,381	1,565	147,558	341,837
Ohlinger & Co.	121,105	9,375	43,768	72,303	246,551						246,551
J. G. Araujo	26,450	4,423	41,905	1,866	74,644	89,244	7,685	7,447	31,055	135,431	210,075
Adelbert H. Alden, Limited.	154	5,246	13,725	54	19,179	59,949	626	2,221	72,203	134,993	154,172
A. F. de Souza & Co.	14,188		2,818	5,161	22,167						22,167
J. L. Traque	14,230	960	5,220	20,410							20,410
W. Peters	4,800	150	3,420	6,645	15,015						15,015
Seniper & Co.	8,160	800		9,950							9,950
H. Pralow	2,082	66	4,028	1,197	7,373						7,373
Thos. Levy Camille & Co.						144		1,722	150	2,016	2,016
Mesquita & Co.	160				160						160
In transit, Iquitos	431,299	46,598	248,611	480,320	1,206,828	553,767	63,920	23,816	233,753	875,256	2,076,084
Totals, March, 1917	1,134,9	6,918	29,096	47,363	1,206,828	59,934	8,650	23,228	119,925	211,737	256,100
Totals, March, 1917	442,638	40,598	255,529	509,416	1,248,191	613,701	72,570	47,044	353,678	1,086,993	2,335,184

EXPORTS OF INDIA RUBBER FROM PARA AND MANAOS DURING FEBRUARY, 1917.

NEW YORK.

EUROPE.

EXPORTERS.	Fine.	Medium.	Coarse.	Caucho.	Totals.	Fine.	Medium.	Coarse.	Caucho.	Totals.	Grand Totals.
Stowell & Co.	305,539	37,396	144,000	113,015	600,012	193,543	11,393	3,190	8,140	216,246	816,258
J. Marques	13,430	29,718	145,211	1,150	169,419	27,329	89,311	151,133	576,250	786,169	786,169
General Rubber Co.	239,165	19,147	179,192	81,708	519,112	13,577	1,063	953	766	16,359	535,571
Pires Teixeira & Co.	126,252	13,325	118,066	71,982	329,622	11,149				11,149	340,771
Suarez Hermanos & Co., Limited.	163,602		3,197	30,724	197,523				14,039	14,039	211,562
Adelbert H. Alden, Limited.	30,577	12,064	24,028	4,944	70,613	80,344				80,344	151,557
Berringer & Co.	94,622	5,027	19,781	12,039	131,279						131,279
G. Fradelizi & Co.	47,684	5,129	3,605	3,504	57,922	13,832	346			14,178	102,094
Seligmann & Co.	13,024	16	1,879	7,520	23,130						23,130
Sundries	63,030	1,494	98,266	94,626	254,416	7,844	3,383	1,534	8,150	21,011	275,427
From Itacoatiara	1,096,925	123,316	762,189	440,512	2,422,942	630,646	41,568	94,688	182,428	951,570	3,374,512
From Manaos	2,720		1,400	7,300	11,320	900		650	4,100	5,650	15,470
From Iquitos	638,746	151,263	320,240	340,957	1,451,206	643,822	27,590	17,942	200,292	889,646	2,340,852
Totals, February, 1917	1,758,209	274,744	1,090,071	812,796	3,935,820	1,275,368	71,098	113,580	385,270	1,845,316	5,781,136

EXPORTS OF INDIA RUBBER FROM PARA AND MANAOS DURING MARCH, 1917.

NEW YORK.

EUROPE.

EXPORTERS.	Fine.	Medium.	Coarse.	Caucho.	Totals.	Fine.	Medium.	Coarse.	Caucho.	Totals.	Grand Totals.
Stowell & Co.	92,005	10,411	87,322	115,082	304,820	120,093	9,674	1,119		130,886	435,706
J. Marques	122,638	563	82,227	18,159	223,587	67,728	27,789	10,037		105,554	329,141
General Rubber Co.	109,089	2,115	41,398	65,140	217,742	48,266	3,913	2,035		54,253	271,995
Suarez Hermanos & Co., Limited.	188,783		3,950	5,800	198,533	9,076		13,366	10,408	32,850	231,383
Pires Teixeira & Co.	46,331	6,602	43,643	24,795	121,371						121,371
Chamie & Co.					84,374						84,374
G. Fradelizi & Co.	11,832				11,832	53,878				53,878	65,710
Berringer & Co.	19,497	7,275	26,825	8,297	61,894						61,894
Adelbert H. Alden, Limited.			3,393	3,245	6,638	38,510				38,510	48,307
Bitar Irmãos	3,520	1,920	600	20,850	26,890						26,890
Seligmann & Co.	6,916			12,086	19,002						19,002
Sundries	5,687		4,224	8,461	19,372	22,704	2,803	1,583	12,535	39,625	57,997
From Itacoatiara	610,181	32,142	315,880	340,011	1,298,214	360,255	41,170	28,140	22,982	455,556	1,753,770
From Manaos	387,182	51,209	223,097	367,156	1,028,644	302,314	27,164	7,937	197,169	534,634	1,563,278
From Iquitos	126,284	10,492	60,807	115,528	313,111	59,934	8,650	23,228	119,925	211,737	524,848
Totals, March, 1917	1,123,647	93,843	599,784	822,695	2,639,969	723,763	79,993	60,005	340,246	1,204,007	3,843,976

Crude Rubber Statistics for Brazil 1910-1914.

EXPORTS.

	1910.	1911.	1912.	1913.	1914.
.....	8,813,774	9,359,486	9,707,045	7,998,882	7,598,211
.....	53,549	81,829	106,103	94,701	105,878
.....	8,349,306	9,592,742	8,295,030	7,901,291	7,598,211
Totals	17,216,629	17,038,745	19,405,890	16,389,431	15,605,380
UPRIVER MEDIUM:					
.....	1,650,833	1,925,364	1,826,823	1,542,930	1,506,014
.....	8,742	9,531	11,147	12,124	6,252
.....	1,142,306	1,142,306	1,367,270	1,309,817	1,147,205
.....	2,801,881	3,077,201	3,205,240	2,865,194	2,659,471
.....	2,374,591	2,375,172	2,566,511	2,058,873	1,937,755
.....	34,937	46,935	65,299	56,063	50,631
.....	4,957,056	4,710,500	6,021,676	5,153,717	4,534,107
.....	7,366,584	7,132,607	8,653,486	7,268,653	6,522,493
CAUCHO:					
Manaos	3,831,286	2,876,719	3,171,947	4,148,064	3,046,153
.....	3,923	2,705	20,382	28,631	30,173
.....	2,238,390	2,004,856	3,382,254	3,140,125	3,217,546
.....	6,073,599	4,884,280	6,574,583	7,316,820	6,293,872
.....	6,207	14,219	10,294	12,226	44,276
.....	6,940	25,509	42,173	61,888	36,471
.....	649,635	276,784	540,635	489,409	632,044
.....	679,445	670,794	312,587	595,034	632,044
.....	34,138,137	32,652,983	38,151,780	34,435,132	31,713,260
PARA—(ALL SORTS):					
.....	16,670,484	16,536,741	17,272,326	15,748,749	14,088,133
Itacoatiara	101,151	141,000	202,931	191,519	192,934
Para	16,687,057	15,304,448	20,363,942	17,898,689	16,800,149
San Luiz do Maranhão	6,207	14,219	10,294	12,226	44,276
Ilha do Cajueiro	26,432	6,940	25,509	42,173	61,888
.....	380	649,635	276,784	540,635	489,409
Totals	34,138,137	32,652,983	38,151,786	34,435,132	31,713,260
To—					
.....	489,597	735,781	685,683	430,345	67,144
Belgium	112,847	137,647	111,894	13,080	67,144
United States	14,373,486	15,461,010	20,486,200	16,506,910	18,674,122
.....	2,036,326	3,049,593	2,787,865	1,282,952	1,282,952
Great Britain	15,721,749	14,277,521	13,768,318	13,836,087	10,773,356
Italy	.....	.....	.....	36,471	36,471
Uruguay	479,200	250,882	432,359	422,265	422,265
Totals	34,138,137	32,652,983	38,151,786	34,435,132	31,713,260
From—					
Manaos	.....	300	.....	.....	.....
San Luiz do Maranhão	9,797	10,434	14,815	9,797	11,907
.....	581,084	686,295	609,772	436,428	287,128
.....	.....	398	.....	.....	.....
Fortaleza	1,027,838	949,876	1,088,525	435,631	548,649
.....	847	4,358	1,473	4,874	4,874
.....	48,911	77,428	117,757	113,373	113,373
.....	1,747,868	1,929,533	542,783	764,838	764,838
Totals	3,618,206	3,444,531	3,724,829	1,555,243	1,730,769
To—					
Germany	272,424	352,355	686,499	233,201	35,791
Belgium	15,154	16,330	1,400	427	427
United States	908,743	653,695	775,150	283,300	690,601
.....	1,172,355	1,368,891	400,805	315,846	315,846
Great Britain	1,516,195	1,226,140	879,896	637,790	688,104
Holland	.....	23,656	.....	.....	.....
Uruguay	.....	.....	.....	147	.....
Totals	3,618,206	3,444,531	3,724,829	1,555,243	1,730,769

MANAOS.

	1910.	1911.	1912.	1913.	1914.
From—					
Para	340	1,384	2,472	581	.....
San Luiz do Maranhão	25,101	9,193	7,457	8,607	6,839
Ilha do Cajueiro	54,327	58,469	35,818	34,226	14,026
.....	26,392	8,411	1,878	1,370	.....
Aréia Branca	.....	.....	.....	.....	3,049
Natal	11,579	3,140	15,091	5,290	955
Cabedello	18,263	11,401	6,319	4,177	.....
Pernambuco	72,351	22,976	12,604	2,024	3,606
Manaos	7,883	6,169	3,375	1,386	60
Aréia Branca	.....	700	261	.....	.....
Belém	188,284	44,740	96,034	50,012	41,233
Rio de Janeiro	182,344	131,134	135,117	47,234	2,384
Santos	94,445	64,284	47,702	29,367	8,403
Porto Murtinho	4,435	1,837	9,951	3,291	.....
Corumbá	95,387	76,326	14,792	38,321	5,415
Totals	781,082	437,163	388,871	226,276	85,970
To—					
Germany	326,991	208,000	224,708	85,288	15,297
Argentina	.....	.....	.....	578	479
Belgium	3,190	1,774	.....	1,600	693
Cape Colony	.....	.....	.....	1,875	.....
United States	167,635	31,294	60,240	16,757	32,555
France	33,557	8,414	10,534	5,769	9,401
Great Britain	189,761	158,201	80,043	83,655	22,209
Holland	.....	150	.....	.....	.....
Italy	.....	.....	1,480	.....	200
Paraguay	1,403	.....	.....	360	.....
Portugal	.....	2,780	1,225	1,000	.....
Uruguay	58,545	26,528	10,641	29,394	5,136
Totals	781,082	437,163	388,871	226,276	85,970
SCRAP:					
From—					
Manaos	9,545	12,458	20,603	14,900	.....
To—					
Germany	2,327	8,113	13,247	9,355	.....
France	7,218	4,345	7,356	5,545	.....
Totals	9,545	12,458	20,603	14,900	.....
BALATA:					
From—					
Manaos	.....	.....	.....	.....	1,490
To—					
Great Britain	.....	.....	.....	.....	1,490
TOTAL RUBBER:					
From—					
Manaos	16,680,029	16,549,199	17,292,929	15,764,444	14,089,623
Itacoatiara	101,151	141,000	202,931	191,519	192,934
Obidos	.....	.....	.....	1,141	.....
Para	16,687,397	15,306,132	20,366,414	17,899,270	16,800,149
San Luiz do Maranhão	41,105	33,846	32,566	31,020	63,022
Ilha do Cajueiro	647,443	751,704	671,099	512,827	363,042
Amatão	.....	.....	.....	11,479	.....
Camocim	.....	398	470	.....	.....
Fortaleza	1,054,230	955,256	1,090,403	435,631	548,649
Aréia Branca	.....	.....	.....	.....	3,049
Natal	23,401	3,987	19,449	6,763	5,829
Cabedello	22,213	11,401	6,319	4,177	.....
Pernambuco	121,813	71,887	90,032	119,781	116,979
Manaos	7,883	6,169	3,375	1,386	60
Aréia Branca	.....	700	261	.....	.....
Belém	213,888	1,792,608	2,025,567	592,795	806,071
Rio de Janeiro	182,344	131,134	135,117	47,234	38,555
Santos	94,445	64,284	47,702	29,367	8,403
Porto Murtinho	4,815	1,837	9,951	3,291	.....
Corumbá	741,813	725,961	291,576	578,956	494,824
Totals	38,546,970	36,547,135	42,286,089	36,231,551	33,531,489
To—					
Germany	1,554,334	1,058,087	1,660,235	1,013,527	481,433
Argentina	.....	.....	143	13,658	67,623
Belgium	131,191	155,751	126,144	174,748	1,120
Cape Colony	.....	.....	.....	1,875	.....
United States	15,449,864	16,145,999	21,321,590	16,806,967	19,397,278
France	3,444,728	3,221,440	4,436,374	3,199,984	1,608,199
Great Britain	17,427,705	15,661,862	14,728,257	14,557,532	11,485,159
Holland	.....	23,806	.....	.....	.....
Italy	.....	.....	1,480	.....	36,671
Paraguay	1,403	.....	.....	360	.....
Portugal	.....	2,780	1,225	1,000	26,605
Uruguay	537,745	277,410	10,641	461,900	427,401
Totals	38,546,970	36,547,135	42,286,089	36,231,551	33,531,489

RUBBER STATISTICS FOR THE DOMINION OF CANADA.

IMPORTS OF CRUDE AND MANUFACTURED RUBBER.

	January, 1917.	
	Pounds.	Value.
UNMANUFACTURED—free:		
Rubber and gutta percha, crude (wholesale or india rubber):		
From—		
Great Britain	318,825	\$197,245
United States	674,468	429,737
Straits Settlements	91,699	54,861
Other countries	95	3
Totals	1,085,027	\$681,881
Rubber, recovered:		
From—		
Great Britain	29,484	\$1,548
United States	620,874	80,734
Totals	650,358	\$82,282
Hard rubber, in sheets and rods:		
From—		
United States	8,209	\$1,427
Rubber substitute:		
From—		
United States	71,165	\$7,236
Rubber, powdered, and rubber or gutta percha waste:		
From—		
Great Britain	4,928	\$729
United States	108,119	10,198
Other countries	767	40
Totals	113,814	\$10,973
Rubber thread, not covered:		
From—		
United States	3,080	\$4,582
Chicle, crude:		
From—		
United States	540,480	\$178,773
British Honduras	394,635	141,539
Mexico	52,380	16,071
Totals	987,495	\$336,383
MANUFACTURED—dutiable:		
	General Tariff. Value.	Preferential Tariff. Value.
Boots and shoes:		
From—		
United States	\$24,371	
Belting:		
From—		
United States	\$6,352	
Waterproof clothing:		
From—		
Great Britain		\$31,961
United States	\$24,636	
Totals	\$49,607	\$31,961
Hose, lined with rubber:		
From—		
Great Britain		\$1
United States	\$7,308	
Totals	\$7,308	\$1
Mats and matting:		
From—		
United States	\$85	
Packing:		
From—		
Great Britain		\$41
United States	\$10,352	
Totals	\$10,352	\$41
Tires of rubber for all vehicles:		
From—		
Great Britain		\$2,182
United States	\$93,099	
France	16	
Totals	\$93,315	\$2,182
Rubber cement and all other manufactures of india rubber and gutta percha, N.O.P.:		
From—		
Great Britain	\$27	\$7,323
United States	68,315	
Other countries	3	
Totals	\$68,345	\$7,323

	January, 1917.	
	Pounds.	Value.
Webbing—over one inch wide:		
Great Britain		\$954
United States	\$24,197	
Totals	\$24,197	\$954

EXPORTS OF DOMESTIC AND FOREIGN RUBBER GOODS.

	January, 1917.	
	Produce of Canada. Value.	Reexports of Foreign Goods. Value.
MANUFACTURED—		
Belting:		
To—		
United States	\$517	
Newfoundland	1,130	
Totals	\$1,647	
Hose:		
To—		
Great Britain	\$2,000	
United States	20	\$18
Newfoundland	648	
Other countries	8,637	
Totals	\$11,305	\$18
Boots and shoes:		
To—		
Great Britain	\$25,108	
United States	27	\$0
Newfoundland	15,423	
Antigua	2,115	
New Zealand	17,330	
Other countries	1,448	
Totals	\$61,451	\$0
Tires:		
To—		
Great Britain	\$296	
United States	3,125	\$821
Newfoundland	40	
Other countries	1,998	
Totals	\$5,459	\$821
Waterproof clothing:		
To—		
Great Britain	\$190	
United States		\$46
Other countries	1	
Totals	\$202	\$46
Waste:		
To—		
United States	\$792	\$8,483
All other, N. O. P.:		
To—		
Great Britain	\$626	\$500
United States	144	1,505
Newfoundland	91	
Other countries	603	
Totals	\$1,464	\$2,005
Gum chicle:		
United States	\$160,710	

RUBBER STATISTICS FOR ITALY.

IMPORTS OF CRUDE AND MANUFACTURED RUBBER.

	Eleven Months Ending November, 1916.	
	Pounds.	Lira.
UNMANUFACTURED—		
India rubber and gutta percha—raw and reclaimed:		
From—		
Great Britain	3,813,920	
Straits Settlements	1,186,460	
African French Colony	27,500	
Belgian Congo	219,120	
Brazil	4,226,200	
Other countries	1,712,920	
Totals	11,186,120	40,676,800
Rubber scrap	6,279,020	2,568,690
MANUFACTURED—		
India rubber and gutta percha—threads:		
From—		
United States	61,600	
Great Britain	27,720	
Other countries	6,380	
Totals	95,700	\$73,000

	Eleven Months Ending November, 1916.	
	Pounds.	Lira.
India rubber and gutta percha—sheets:		
Cut sheets	3,740	28,900
Elastic fabric	1,760	3,600
Insulated wire	440	600
Hard rubber	79,860	290,400

	Eleven Months Ending November, 1916.	
	Pounds.	Lira.
India rubber and gutta percha—tubes:		
Cut sheets	1,100	9,000
Elastic fabrics	13,200	36,000
Other forms	6,600	21,000
Rubber coated fabrics, pieces	127,820	406,700
	114,620	729,400

	Eleven Months Ending November, 1916.	
	Pounds.	Lira.
MANUFACTURED—		
From—		
Great Britain	42,020	
Other countries	1,760	
Totals	43,780	199,000

	Eleven Months Ending November, 1916.	
	Pounds.	Lira.
Boots and shoes:		
United States	30,266	
France	10,299	
Other countries	179	
Totals	49,744	248,720

	Eleven Months Ending November, 1916.	
	Pounds.	Lira.
Elastic webbing:		
France	26,180	
Great Britain	13,640	
Other countries	13,860	
Totals	53,680	366,000

	Eleven Months Ending November, 1916.	
	Pounds.	Lira.
Clothing and articles for household use:		
Articles not specified from cut sheets	3,080	32,200
	13,640	124,000

	Eleven Months Ending November, 1916.	
	Pounds.	Lira.
Fabrics:		
From—		
Great Britain	219,340	
France	115,060	
Other countries	9,020	
Totals	343,420	1,404,900

	Eleven Months Ending November, 1916.	
	Pounds.	Lira.
Tires and tubes:		
From—		
France	1,508,540	
Great Britain	488,840	
Other countries	31,240	
Totals	2,028,620	18,442,000

	Eleven Months Ending November, 1916.	
	Pounds.	Lira.
Other rubber manufactures:		
From—		
United States	1,372,140	
France	942,700	
Great Britain	819,720	
Other countries	1,320	
Totals	3,135,880	11,403,200
Total Imports		77,861,110

EXPORTS OF CRUDE AND MANUFACTURED RUBBER.

	Eleven Months Ending November, 1916.	
	Pounds.	Lira.
UNMANUFACTURED—		
India rubber and gutta percha—raw and reclaimed:		
To—		
United States	496,980	
Great Britain	40,040	
Straits Settlements	419,980	
Other countries	14,080	
Totals	971,080	1,765,600

	Eleven Months Ending November, 1916.	
	Pounds.	Lira.
India rubber and gutta percha—threads:		
To—		
France	11,880	
Great Britain	10,120	
Straits Settlements	12,540	
Other countries	7,040	
Totals	49,280	448,000

	Eleven Months Ending November, 1916.	
	Pounds.	Lira.
India rubber and gutta percha—sheets:		
Cut sheets	4,620	35,700
Elastic fabric	3,520	7,200
Insulated wire		1,200
Hard rubber	45,540	165,600

[MAY 1, 1917.

To—		
Great Britain	11,220	.....
Spain	44	.....
Argentina	24,860	.....
Brazil	254	.....
Uruguay	3,300	.....
Other countries	2,420	.....
		<hr/>
Totals	42,460	386,000
Fabrics	78,760	322,200

IMPORTS.

Germany	69,000	+	69,000
France	9,000	--	9,000
Italy	56,000	--	56,000
Great Britain	124,000	8,000	—116,000
Other countries.....	106,000	10,000	-- 96,000
Totals	295,000	87,000	—208,000

February, 1917.

		EXPORTS.			
		February, 1917.			
UNMANUFACTURED		London.		Liverpool.	
		Pounds.	£ Sterling.	Pounds.	£ Sterling.
Waste and reclaimed rubber					
manufactures of the United Kingdom:					
To—					
United States	717,500	5,660	380,800	10,016	
Russia			126,300	4,998	
France	51,700	1,925	45,200	2,046	
Italy	36,000	450	40,200	900	
Canada	17,900	172			
Japan	22,400	319			
Totals	845,500	8,526	592,500	17,960	
		REEXPORTS.			
Crude rubber:					
To—					
United States	7,868,600	1,154,444	394,400	41,416	
Russia			1,139,900	150,880	
France	1,077,000	314,082	898,800	137,109	
Italy	673,800	95,108	405,400	62,110	
Spain			13,000	1,510	
Netherlands			53,900	7,873	
Victoria	4,000	524	4,000	435	
China	54,000	84,542	68,200	8,623	
India (including British and leased territories in China)			2,000	385	
New South Wales			5,600	575	
Totals	11,297,200	1,648,700	2,985,200	410,916	
Waste and reclaimed rubber:					
To—					
United States			22,300	822	
France			9,700	140	
Italy			17,500	525	
India (including British and leased territories in China)			800	39	
Canada			11,100	560	
Denmark (including Faroe Islands)	2,200	110			
Totals	2,200	110	61,400	2,086	
The value of a £ Sterling is \$4.76.					

RUBBER IMPORTS AT BORDEAUX, FRANCE.

During 1916 French rubber imports were more than double those of 1915. The total for the port of Bordeaux was 4,021,133 pounds against 1,704,282 pounds in 1915, as follows:

FROM	1916.	1915.
Congo	447,000	447,000
Conakry, Rio Nunez and Bossa	77,274	77,274
Soudan	235,553	26,744
Casamance	123,523	37,289
Ivory Coast	254,015	75,770
Madagascar	6,147	6,147
Manicoba	139,582	188,870
Indo China	7,707	7,707
Palata	259,570	130,956
Totals	4,021,133	1,704,282

These figures include only direct importations from the above countries. Stocks on hand, December 31, 1916, totaled 130 tons.

THE MARKET FOR RUBBER SCRAP.

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NEW YORK.

THE active demand that was anticipated after hostilities with Germany were definitely announced has failed to materialize. In fact, the past month was very quiet in the rubber scrap market and prices have not undergone any material change. The usual spring arrivals have been held up by shipping difficulties that continued to interfere with the movement of supplies. The consuming trade has shown small interest in the market and buying has been confined to small lots for immediate requirements. The tendency in all quarters is to await the outcome of the unusual conditions prevailing at this time.

BOOTS AND SHOES. There was very little attention paid to this material during the month, and while the delivered price was nominally held at 9 cents, dealers were asking 9¼ cents. Trimmed arctics received moderate attention early in the month but later became dull and the prices recorded show no change from last month's report.

TIRES. The lack of demand for white G. & G. tires has resulted in easier prices and quotations for this grade are around 7½ cents delivered. Mixed tires have been fairly steady at unchanged prices. Solid tires have been in moderate demand at prices ranging from 6 to 6½ cents.

INNER TUBES. This material has become easier, due, no doubt, to the steady position of crude rubber. No. 1 tubes are now 25½ cents delivered as compared to 26 and 27 cents quoted a month ago.

MECHANICALS. There has been a fairly good call for garden hose and prices show an advance of about ½ cent a pound since last month. The other grades have received no attention, and prices have remained unchanged.

London and Liverpool imports of waste and reclaimed rubber for February were 38,000 pounds against 538,400 pounds for January. Reexports for February were 63,600 pounds against 1,417,800 pounds for January.

NEW YORK QUOTATIONS FOR CARLOAD LOTS DELIVERED

APRIL 29, 1917

Prices subject to change without notice.

	Per Pound.
Boots and shoes	
Trimmed arctics	
Untrimmed arctics .....	.06½ @
White tires Goodyear and Goodyear	
Auto tires, standard white .....	.07 @
standard mixed .....	.06½ @
stripped, unguaranteed .....	.05½ @
Auto peelings, No. 1 .....	.10 @
No. 2 .....	.08½ @
Inner tubes, No. 1 .....	.25½ @
No. 2 .....	.12½ @
red .....	.11 @
Irony tires .....	.04 @
Bicycle tires .....	.04½ @

	Per Pound.
Solid tires .....	.06½ @
White scrap, No. 1 .....	.13½ @
No. 2 .....	.10 @
Red scrap, No. 1 .....	.10 @
No. 2 .....	.08 @
Mixed black scrap, No. 1 .....	.04 @
No. 2 .....	.04 @
Rubber car springs .....	.04½ @
Horse shoe pads .....	.04 @
Mating and packings .....	.04 @
Garden hose .....	.02½ @
Air brake hose .....	.05½ @
Cotton fire hose .....	.02½ @
Large hose .....	.01 @
Hard rubber scrap, No. 1, bright fracture .....	.26 @
Battery jars (black compound) .....	.03 @
Insulated wire stripping03½ @
Rubber heels03½ @

THE MARKET FOR COTTON AND OTHER FABRICS.

NEW YORK.

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THE entry of this country in the war materially increased the buying movement that was in evidence early in April when middling cotton was quoted 19.35 cents for spot. War stimulation soon carried the market over the 20-cent mark, and on April 9, middling spot cotton was selling at 20.15 cents with July futures at 21.40 cents. Since then the market has been nervous and unsettled, traders showing a pronounced tendency to await developments. As the month progressed there was less demand for spot cotton and prices softened, 20.05 cents being the quotations on April 26.

EGYPTIAN COTTON. An extraordinary demand for Egyptian has characterized the April market. The extremely small spot stocks available and the British embargo have complicated the situation. Direct shipment in American bottoms appears to be the only relief and is hopefully looked forward to by the consuming trade. Prices are extremely high, the best grades of Sakellarides have sold as high as 70 cents during the month. For the period, August 1 to March 14, 1917, 105,215 bales were exported from Alexandria to the United States, against 173,033 bales for the same period a year ago. Mail advices from Alexandria, dated March 23, state that all business with America has stopped and no arrangements for direct shipments have been made.

SEA ISLAND COTTON. There has been a steady demand during the month, but business has been restricted by the scarcity of stocks. Prices have advanced steadily and quotations are difficult to obtain; however, sales at 75 cents have been reported. For the period, August 1 to March 30, 1917, 86,178 bales were shipped from southern ports, as compared to 63,225 bales for the same period last year.

TIRE FABRICS. Business has been brisk, the matter of delivery being the paramount question. The mills are all sold up to the end of the year and some contracts with consumers cover part of next year's requirements. The scarcity of Sea Island and Egyptian staples has created an active demand for Peeler fabrics. The cord fabrics made of cabled yarn are particularly in favor at this time. Standard 17¼-ounce Sea Island and Egyptian building fabrics have advanced about 5 cents a square yard and all indications are for higher prices.

SHEETINGS, DRILLS AND OSNABURGS. All grades have been in heavy demand with the question of delivery being the controlling factor. Prices have advanced in the entire list from 1 to 3 cents a yard.

HOSE AND BELTING DUCK. Government requirements have greatly stimulated this material by the call for large quantities of army duck. Prices on mechanical duck have advanced about 5 cents a pound during April and higher levels are predicted for the future.

NEW YORK QUOTATIONS.

APRIL 1

Prices subject to change without notice.

Woolen Fabrics			
Wamsutter, S. A. I. L. No. 1, 40 inch.....	yard	3.4	
No. 4, 38½-inch.....			
Wool Stockinettes 52-inch:			
A—14 ounce.....	yard		
B—14 ounce.....			
C—14 ounce.....			
Cotton Stockinettes 52-inch:			
D—14 ounce.....	yard		
E—11½ ounce.....			
F—14 ounce.....			
G—8 ounce.....			
H—11 ounce.....			
I—9 ounce.....			
Colors: white, black, blue, brown			
Knitfab Stockinette.....	lb.		
Tire Fabrics:			
17¼-ounce Sea Island, combed.....	square yard		
17¼-ounce Egyptian, combed.....			
17¼-ounce Egyptian, carded.....			
17¼-ounce Peckers, carded.....			
Sheeting:			
40-inch 2.35 yard.....	yard		
40-inch 2.50 yard.....		.15 @	
40-inch 2.70 yard.....		.14½ @	.14¾
40-inch 2.85 yard.....		.14 @	
40-inch 3.15 yard.....		.13 @	
Osnaburgs:			
40-inch 2.25 yard.....	yard		
40-inch 2.48 yard.....			
37½-in. 2.42 yard.....		.16 @	
Mechanical Ducks:			
Hose.....	pound	4 @	12
Belting.....		14 @	4
Carriage Cloth Duck:			
38-inch 2.00-yard enameling duck.....	yard		
38-inch 1.74 yard.....			
72-inch 16.66-ounce.....		47½ @	
72-inch 17.21-ounce.....		49 @	
Drills:			
38-inch 2.60 yard.....	yard	.20 @	
40-inch 2.47 yard.....		.19 @	
52-inch 1.90-yard.....		.22 @	
52-inch 1.95-yard.....		.21 @	
60-inch 1.52-yard.....		.27 @	
Imported Woolen Fabrics Specially Prepared for Rubberizing—Plain and Fancies:			
63 in. 3½ to 7½ ounces.....	yard	.38 @	1.55
36-inch, 2½ to 5 ounces.....		.35 @	.85
Imported Plaid Lining (Union and Cotton):			
63 inch, 1 to 4 ounces.....	yard	.35 @	.75
36-inch, 2 to 4 ounces.....		.25 @	.50
Domestic Worsted Fabrics:			
36 inch, 4½ to 8 ounces.....	yard	.37 @	.65
Domestic Woven Plain Linings (Cotton):			
36 inch, 3½ to 5 ounces.....	yard	.19 @	.18
Raincoat Cloth (Cotton):			
Bombazine.....	yard	.08 @	.09
Twills.....		.12 @	.18
Tweed.....		.25 @	.35
Tweed, printed.....		.07½ @	.15
Plaid.....		.08½ @	.10
Repp.....		.24 @	.27
Burlaps:			
32—7½-ounce.....	100 yards		
40—7½-ounce.....			
40—8-ounce.....			
40—10 ounce.....			
40—10½ ounce.....			
45—7½-ounce.....			
45—8 ounce.....			
48—10 in.....			

EGYPTIAN COTTON CROP MOVEMENT.

FROM AUGUST 1 TO MARCH 14, 1917.

To—	1916-17.	1915-16.	1914-15.
Exported.....	bales	177,777	153,380
Manchester.....	109,836	117,380	125,420
Total.....		295,157	278,800
To—			
.....	16,434	14,000	30,379
.....	1,061		
.....			
.....	1,800	38,718	127,848
.....			
.....	61	3,000	3,330
.....		80	1,860
Total shipments to Continent.....		11,786	19,446
Total Shipments.....	1	173,083	107,081
Total.....	10,100	18,010	10,800
Total shipments to all parts.....	1,061	599,156	589,960
Total crop (Interior gross weight) cantars.....		4,726,518	6,473,726

RUBBER IN AIRCRAFT CONSTRUCTION.

IN a lecture recently delivered before the Aeronautical Society, London, Captain G. S. Walpole remarked that materials, other than metal, used in aeronautics were less satisfactory, owing to the fact that they are more easily influenced by time, temperature and humidity, and that the best results cannot be obtained with the same directness and precision of forecast.

He showed that in such rubber parts as shock-absorbing devices and tires in airplanes, not only shape, size and arrangement were to be considered, but also the composition and properties of the material. In this connection, he complained of the lack of co-operation between rubber manufacturers and aircraft designers, instancing the ignorance of manufacturers as to the work required of shock-absorbers. The ideal shock-absorber, he asserted, should be like a "pudding," which gives to a load and slowly resumes its shape. Steel springs are unsuitable, because when loaded, they "hit" back at once. He also considered the possibility of obtaining increased shock-absorbing power from shock-absorber rings by employing different rubber mixtures, discussed the use of rubber for conveying petrol, oil, and hot water, and described the rubber-proofing of fabric for balloons. Tests of airplane tires were shown on slides, one wheel having been loaded to 5 tons, which caused the spokes to collapse, but did not affect the tire.

In dealing with other materials, he discussed the development of the waterproof form of "fiber," and remarked that the ordinary form is not isotropic, but has markedly different properties towards humidity in two directions at right angles to each other—a quality to be carefully watched in magneto work.

THE MARKET FOR CHEMICALS AND COMPOUND-INGREDIENTS.

NEW YORK.

Copyright 1917

WITH the declaration of war came the uncertainty as to what the Government will require in base metals. Pig lead has been in great demand and sellers have adopted a waiting policy. The inactivity in copper is due to buyers holding off for future developments. Spelter continues to be weak and prices have declined. The antimony market has been dull and prices steady.

The shipping difficulties that have beset the foreign and domestic rubber chemical trade for some time have continued during the past month. There has been a good demand, the many inquiries received by the dealers during April showing that buyers are wisely anticipating future requirements.

CHINA CLAY. The steady call, limited supplies and freight difficulties have resulted in advanced prices for this material.

GLUE. All the various grades are in demand and higher prices have been recorded during the month.

HEXAMETHYLENE TETRAMINE. This organic vulcanizing accelerator has advanced 5 cents a pound since our last report.

LEAD PIGMENTS. Red oxide, sublimed blue and white lead, basic carbonate, basic sulphate litharge and orange mineral have all advanced, due to the strong position of pig lead.

LITHOPONE. The market for this material has been firm with small supplies available, and producers are well sold ahead. Spot stocks of both domestic and foreign grades are limited.

TALC. The strong position of both domestic and foreign grades and the steady demand is reflected in advanced prices.

SULPHUR. The strong position of brimstone has resulted in a sharp advance in all grades of sulphur. Flour is now quoted \$2.90 per hundredweight.

VERMILIONS. All grades are in demand and supplies limited. English vermilion is now quoted \$2 a pound.

ZINC OXIDE. There has been a good demand during the month and many inquiries for future positions have been noted. The new schedule for French process grades that went into effect April 1, shows a decline of about 2½ cents a pound in prices quoted last month. There has been no change in the American grades.

NEW YORK QUOTATIONS.

APRIL 26, 1917.

Subject to change without notice.

Accelerene	lb	\$2.62 @	
Acetone (drums)	lb	Nominal	
Acid, acetic, 28 per cent. (bbls.)	lb	.04½ @	.05
cresylic (crude)	gal	1.00 @	
glacial, 99 per cent (carboys)	lb	.28 @	.30
muriatic, 20 degrees	lb	.01¾ @	
nitric, 36 degrees	lb	.05¼ @	
sulphuric, 66 degrees	lb	.01¾ @	
Aldehyde ammonia (crystals)	lb	1.00 @	
Aluminum Flake (carloads)	ton	24.00 @	
Ammonium carbonate	lb	Nominal	
Antimony, crimson, sulphuret of (casks)	lb	.50 @	
crimson, "Magmetco"	lb	Nominal	
crimson, "Mephisto" (casks)	lb	.51 @	
golden, sulphuret of (casks)	lb	.28 @	
golden, "Magmetco"	lb	Nominal	
golden, "Mephisto"	lb	.30 @	
golden, sulphuret, States brand, 16-17 per cent. lb.	lb	.28 @	
red sulphuret, States brand	lb	.25 @	
vermilion sulphuret	lb	.60 @	
Asbestine (bags)	ton	17.00 @	20.00
Asbestos (bags)	ton	35.00 @	50.00
Barium sulphate, precipitated	lb	.04 @	
Barytes, pure white	ton	30.00 @	35.00
off color	ton	17.50 @	24.00
Basofof	ton	80.00 @	
Benzol, pure	gal	.55 @	.60
90 per cent.	gal	.55 @	.60
Beta-Naphthol (f. o. b. New York)	lb	.95 @	
Brown oxide of iron	lb	.01½ @	.02
sienna, raw and burnt	lb	.06 @	.12
umber, raw and burnt	lb	.05 @	.06
ochre, domestic	lb	.02 @	.02½
imported	lb	.03½ @	.04
Bone ash	lb	.10 @	
black	lb	.06 @	.15
Cadmium tri-sulphate (f. o. b. London)	lb	2.49 @	
sulphide, yellow	lb	2.15 @	2.25
Canella gum	lb	.33 @	
Carbon, bisulphide (drums)	lb	.05 @	.06½
black (cases)	lb	.25 @	.35
tetrachloride (drums)	lb	.15 @	.18
Caustic soda, 76 per cent.	lb	.04¾ @	.05
Chalk, precipitated, extra light	lb	Nominal	
precipitated, heavy	lb	.05 @	
China clay, domestic (powdered)	ton	20.00 @	25.00
imported (powdered)	ton	40.00 @	50.00
Chrome, green	lb	.14 @	.45
yellow	lb	.23 @	.25
Cotton linters	lb	.07½ @	
Excellerex	lb	.85 @	
Fossil flour	lb	.03 @	.05
Gas black (cases)	lb	.25 @	.35
Gilsonite	ton	40.00 @	
Glue, high grade	lb	.40 @	.70
medium	lb	.30 @	.40
low grade	lb	.18 @	.28
Glycerine, C. P. (drums)	lb	.56 @	.58
Graphite, flake (400 pound bbl.)	lb	Nominal	
amorphous	lb	Nominal	
Green oxide of chromium (casks)	lb	.80 @	.85
Ground glass (fine)	lb	Nominal	
Hexamethylene Tetramine (powdered)	lb	.75 @	.80
Indian red, reduced grades	lb	.04½ @	.07½
pure	lb	.09 @	.10
Infusorial earth, powdered	ton	60.00 @	
bolted	ton	65.00 @	70.00

Iron oxide, red, reduced grades	lb	.02½ @	.05
red, pure, bright	lb	.12 @	.14
red, excelstar	lb	.18 @	
Ivory, black	lb	.06 @	.10
Lampblack	lb	.05 @	.12
Lead, red oxide of	lb	.11 @	.11½
sublimed blue	lb	.09½ @	
sublimed white	lb	.09½ @	.10½
white, basic carbonate	lb	.09½ @	
white, basic sulphate	lb	.09½ @	
black hyposulphite (Black Hypo)	lb	Nominal	
Lime, flour	lb	.01½ @	.02
Litharge, domestic	lb	.10½ @	.11
English	lb	.12 @	.13
sublimed	lb	.10½ @	
Lithopone, imported	lb	.10 @	.14
domestic	lb	.06½ @	.07
Beckton white (carloads)	lb	Nominal	
Magnesia, carbonate	lb	.11 @	.13
calcined, heavy	lb	.10½ @	.11
heavy, Thistle Brand	lb	.12 @	
light	lb	.45 @	.50
Magnesite, calcined, powdered	ton	60.00 @	70.00
Mica, powdered	lb	.03½ @	.05
Mineral rubber	lb	.02 @	.05
"M. R. X."	ton	100.00 @	
"Gemasco" (carloads)	ton	Nominal	
"Pioneer"	ton	Nominal	
"Richmond Brand"	lb	.03 @	
"No. 64 Brand"	ton	40.00 @	
"Refined Elaterite"	lb	.05 @	
"Rubrax"	ton	Nominal	
Naphtha, stove gasoline (steel bbls.)	gal	.24 @	
66@68 degrees (steel bbls.)	gal	.29 @	
68@70 degrees (steel bbls.)	gal	.30 @	
V. M. & P. (steel bbls.)	gal	.21 @	
Oil, aniline	lb	.32 @	
corn, refined (Argo)	cwt	16.51 @	
linseed (bbl.)	gal	1.21 @	
palm	lb	.14½ @	.15
paraffin	gal	Nominal	
pine (cases)	gal	.58 @	
rapeseed, blown	gal	1.35 @	1.40
rosin	gal	.37 @	.67
tar (cases)	gal	.22 @	
soluble aniline colors, yellow, orange	lb	2.50 @	
Orange mineral, domestic	lb	.13 @	.15
Paragol (carloads)	cwt	.11 @	.14
Petrolatum	lb	.05½ @	
Petroleum grease	lb	.03½ @	
Pine solvent	lb	None	
Pine tar	bbl	Nominal	
Pitch, burgundy	lb	Nominal	
coal tar	bbl	4.50 @	
pine tar	lb	Nominal	
Plaster of paris	lb	1.50 @	1.70
Prussian blue	lb	.75 @	.90
Pumice stone, powdered (bbls)	lb	.03 @	.04
Resin, Pontianak, refined	lb	None	
granulated	lb	None	
fused	lb	None	
Rosin (500 pound bbls.), @ 280 lbs.	bbl	5.95 @	8.50
Rotten stone, powdered	lb	.02½ @	.04
Rubber black	lb	.06 @	
Rubber substitute, black	lb	.09½ @	.13½
white	lb	.14 @	.18
brown	lb	.13½ @	.18
Rubhide	lb	.35 @	
Shellac, fine orange	lb	.63 @	.65
Silex (silica)	ton	24.00 @	35.00
Soapstone, powdered	ton	.12 @	.15
Starch, corn, powdered	cwt	4.97 @	
Sulphur chloride (drums)	lb	.08 @	.09½
Sulphur, flour, velvet, brand (carloads)	cwt	2.90 @	2.95
Bergenport flour	cwt	2.85 @	3.25
Talc, American	ton	12.00 @	20.00
French	ton	24.00 @	35.00
Tolnol, pure	gal	1.75 @	2.00
Tripolite earth, powdered	ton	60.00 @	
bolted	ton	60.00 @	
Turpentine, pure gum spirits	gal	.51 @	.51½
wood	gal	.48 @	
Venice	gal	.18 @	.20
Ultramarine blue	lb	.25 @	.45
Vermilion	lb	.70 @	.80
Chinese	lb	.95 @	1.00
English	lb	2.00 @	
Wax, beeswax, white	lb	.58 @	.62
ceresin, white	lb	.12 @	.20
carnauba	lb	.36 @	.55
ozokerite, black	lb	.55 @	.60
green	lb	.75 @	.78
montan	lb	.33 @	.35
paraffin, refined 118/120 m. p. (cases)	lb	.09 @	
123/125 m. p. (cases)	lb	.09½ @	
128/130 m. p. (cases)	lb	.10½ @	
133/136 m. p. (cases)	lb	.12 @	
yellow, 124/126 m. p. (bbls.)	lb	.07½ @	
Whiting, Alba	cwt	1.00 @	1.25
commercial	cwt	1.00 @	
gilders	cwt	1.00 @	1.25
Paris, white, American	cwt	1.25 @	
English chit-stone	lb	.01½ @	.02
Wood pulp XXX (carloads)	ton	Nominal	
Yellow ochre	lb	.03½ @	.04
india rubber	lb	1.50 @	
Zinc oxide, American process, horsehead brand	lb		
"XX red"	f. o. b. factory lb.	.10 @	
"special"	f. o. b. factory lb.	.10½ @	
French process, red seal	f. o. b. factory lb.	.15½ @	
green seal	f. o. b. factory lb.	.15½ @	
white seal	f. o. b. factory lb.	.16½ @	
Zinc substitutes	ton	30.00 @	
Zinc sulphide, pure	lb	Nominal	



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Vol. LVI. No. 3.

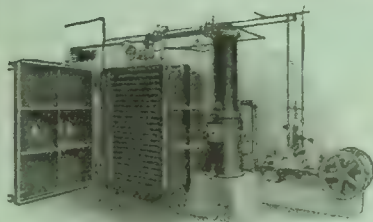
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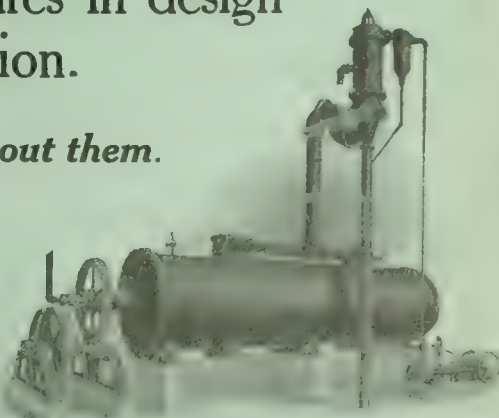


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Published on the 1st of each month by

THE INDIA RUBBER PUBLISHING CO.

No. 25 West 45th Street, New York.

Telephone—Bryant 2576.

CABLE ADDRESS: IRWORLD, NEW YORK.

HENRY C. PEARSON, Editor

Vol. 56

JUNE 1, 1917

No. 3

SUBSCRIPTIONS: \$3.00 per year, \$1.75 for six months, postpaid, for the United States and dependencies and Mexico. To the Dominion of Canada and all other countries, \$3.50 (or equivalent funds) per year, postpaid.

ADVERTISING: Rates will be made known on application.

REMITTANCES: Should always be made by bank draft or Postoffice or Express money order on New York, payable to THE INDIA RUBBER PUBLISHING COMPANY. Remittances for foreign subscriptions should be sent by International Postal Order, payable as above.

DISCONTINUANCES: Yearly orders for subscriptions and advertising are regarded as permanent, and after the first twelve months they will be discontinued only at the request of the subscriber or advertiser. Bills are rendered promptly at the beginning of each period, and thereby our patrons have due notice of continuance.

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Entered at the New York postoffice as mail matter of the second class.

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THE RUBBER INDUSTRY BEFORE THE CIVIL WAR AND NOW.

IN entering the European war the United States has reached another great turning point in her national career. The part she is about to take in the struggle for world democracy surpasses even her stand against slavery and secession, far reaching as were the effects of our Civil war. But America is infinitely better prepared to do its bit today industrially, if not at once in a military way, and, happily, that meets the first needs of our allies.

Because of the necessity for rubber in warfare a comparison of the facts then and now, is of the greatest interest.

In 1860 the value of rubber goods manufactured in the United States was \$5,642,700. The capital in-

vested in 27 companies totaled \$3,534,000; the cost of raw material \$3,056,360; the number of factory hands employed was 2,768, and their annual wages amounted to \$794,570. The industry was then centered in the eastern states and 40 per cent of the entire product was made in Connecticut. New Jersey, New York, Massachusetts and Rhode Island ranked next in order.

Factories have since sprung up in half the States of the Union. New England still continues to be the rubber footwear center, but the development of the motor car has built up a still greater center in the Middle West devoted to tires and miscellaneous rubber goods. In 1914, after 54 years, the rubber industry has increased approximately 100 times. The value of manufactured rubber goods for that year was \$300,994,000. The capital invested in 342 establishments totaled \$267,671,000; the cost of raw material \$163,035,000; the number of factory hands employed was 74,022 and their annual wages amounted to \$44,168,000. To this should be added 14,712 salaried officers of corporations and employes who receive \$16,278,000 annually, making a total of 88,734 persons receiving \$60,446,000.

As the population of the United States at the outbreak of the European war had about trebled since 1860 and our exports of manufactured rubber goods had increased approximately ten times, while the total value of our rubber products had multiplied nearly one hundred fold, it is evident that not far from 70 per cent of the increased business has been due to new applications of rubber, notably tires, and more general use of rubber articles of many sorts.

Of course, the figures given represent only the manufacture of rubber goods and do not show its remarkable growth under the stimulus of the war. They do not include the many importers of crude rubber, or of foreign manufactured goods which amounted to \$1,415,362, the scrap dealers and reclaimers, who did a \$12,500,000 business, the fabric, chemical, machinery and other firms entirely dependent upon the rubber industry for an outlet for their product, nor the army of retailers engaged in the distribution and sale of rubber goods. The statement has been made that 1,000,000 persons depend upon the rubber industry for a livelihood, and while the number is startling the infinite ramifications of the industry make it seem plausible.

Statistics show that exports of domestic rubber manufactures for the fiscal year 1916 amounted to \$35,180,096, or nearly three times those of 1914. Crude rubber imports during the fiscal year 1916 were slightly over 70 per cent in quantity and 100 per cent in value greater than in 1914, so that if the value of American rubber products for 1914 was \$300,994,000 it might be conservatively estimated at \$600,000,000 for 1916 with every indication of a substantial increase during the present year.

THE PROPOSED RUBBER WAR TAXES.

It is difficult to understand why the proposed war tax bill singles out automobile tires and tubes for a 5 per cent levy not imposed upon other rubber manufactures. This means that for war revenue purposes one-third of the rubber product has been classed with liquors, tobacco, amusement tickets and other luxuries. It means further that as crude rubber, like all other imports, will be subject to a flat impost of 10 per cent, tires and tubes must pay double taxes.

The rubber trade as represented by the Legislative Committee of the Rubber Association is advocating a continuance of free rubber and a 5 per cent war tax on all rubber manufactures as being more equitable and raising more revenue than the bill as it now stands. This arrangement, based on 1916 figures, would yield \$30,000,000 as against \$26,517,000, which would result from a 10 per cent duty on the \$164,517,000 crude rubber imports and a 5 per cent tax on the \$200,000,000 tire product.

INDIA RUBBER NOT OBSOLETE.

A RECENT pronunciamento from a committee that is working upon a "Glossary of terms used in the Rubber Industry" will hardly appeal to the scholarly members of the trade. It reads "India-Rubber: An obsolete term for rubber." That the term is not obsolete as far as the best literature of the trade is concerned is not even open to argument.

In "Lectures on India Rubber," edited by David Spence, Ph.D., F.I.C., 1909, occurs the following which is certainly authoritative: The word india rubber, which is still almost exclusively used in English, was first applied, etc.

Furthermore, it can hardly become obsolete because of its value as a term that admits of no confusion or misconception. Leading lexicographers defining india rubber, sometimes giving preference to the word caoutchouc, cite but one substance, the elastic gum that is the basis of the great industry that bears its name.

We append a few definitions of india rubber:

Webster's International Dictionary: A tough elastic substance obtained from the milky juice of various tropical plants.

Standard Dictionary: A soft, flexible and very elastic substance derived from the milky sap of various tropical plants.

Century Dictionary: An elastic gummy substance, the coagulated milky juice of various plants.

Encyclopaedia Britannica: The chief constituent of the milky juice or latex furnished by a number of different trees, shrubs and vines.

Appleton's Encyclopaedia: The inspissated juice or sap of several species of plants of the families *Euphorbiaceae*, *Moraceae*, *Artocarpaceae*, and *Apocynaceae*.

Carl Otto Weber, Ph. D.: The product of the coagulation of the milky juices (emulsion) of a large number of trees, creepers and shrubs, comparable in

this respect to the oils and more particularly the terpenes.

Seligmann, Torrhilon and Falconnet: A hydrocar-bide of vegetable origin extracted from the juice secreted by the protoplasm of so-called primordial cellular tissue of a great number of trees, shrubs and vines, climbers or vine weeds of hot countries.

Journal of the Society of Chemical Industry: The hydrocarbon which occurs in the form of minute globules in the milky juice or latex of many tropical plants.

India Rubber World: A tough elastic substance, the product of coagulation of the milky juice or latex of various tropical trees, shrubs and vines.

These refer and will always refer to one substance only.

On the other hand the word rubber, as defined by the same lexicographers, has the following meanings all in common use:

- (1) One who or that which rubs.
 - (a) An instrument or thing used in rubbing, polishing or cleaning.
 - (b) A coarse file or the rough part of a file.
 - (c) A whetstone: a rubstone.
 - (d) An eraser usually made of caoutchouc.
 - (e) The cushion of an electrical machine.
 - (f) One who performs massage.
 - (g) Something that chafes or annoys.
- (2) The odd game when there is a tie as a rubber of whist.
- (3) Stretching or craning in inquisitive observation, also rubber neck (common slang).
- (4) An overshoe made of india rubber.
- (5) India Rubber: caoutchouc.

Thus, it would seem that india rubber for exact usage is bound to persist. The word rubber with eleven meanings as an equivalent, a secondary term for the sake of brevity, will also continue in use, but as a supplanter, despite its common use, it is not specific nor exact.

Radical changes without good reason are always to be avoided. If, however, the best term is sought, why not call it gum elastic? This was Goodyear's choice and is completely descriptive, and likely to be applied to no other substance.

GERMAN PATENTS AND THE WAR.

IN the event of prolonged hostilities, it is probable that the United States will do much as England has done.

For example, it is perfectly possible that German patents in the United States will be cancelled. This would interest the dye people greatly. It would also interest the chemical concerns and the rubber laboratories, for it would release for manufacture many accelerators on which we now pay royalty to German owners.

A THRILL RUNS THROUGH US WHEN WE READ THAT Hoover as food dictator will serve without compensation. And we should be thrilled at such patriotism. Incidentally we might well utilize a thrill or two in appreciating what men in our own trade are doing without pay. Thomas Robins, H. Stuart Hotchkiss, George B. Hodgman, F. A. Seiberling, A. H. Marks, F. C. Hood, David Spence and others are doing important and exhaustive work for Uncle Sam with no thought of compensation of any sort.

The Rubber Industry Is "Doing Its Bit."

MANUFACTURERS of rubber goods were among the first to place their entire facilities at the disposal of the Government for war preparation. Because of the importance of rubber products in national defense the leading factories in several lines are already turning out large quantities of many materials with which to equip the great armies soon to be raised by selective conscription. Companies so engaged have placed the national welfare above profit or material advantage and are giving first attention to Government requirements at nominal profits. Several companies are now at work on dirigibles for use by the aviation corps.

Quite aside from this wholehearted and important work of equipment, many firms and their employes have engaged in additional patriotic enterprises of many sorts. So varied are these wholesome activities that the disposition of the rubber industry as a whole "to do its bit" becomes evident.

SECURING ADEQUATE RAW MATERIALS.

A notable committee, of which Bernard M. Baruch is chairman, has been chosen to work in cooperation with the Council of National Defense in superintending the production of raw materials for the war at fair prices. Each material will be in charge of a sub-committee, its chairman being a member of the central committee. H. Stuart Hotchkiss, president of the General Rubber Co., and first vice-president of The Rubber Association of America, Inc., is chairman of the rubber committee, which also includes A. H. Marks, Diamond Rubber Co., Akron, Ohio; Frederick C. Hood, Hood Rubber Co., Watertown, Massachusetts.

Further, it is reported that Dr. D. Spence, vice-president and general superintendent of the Norwalk Tire & Rubber Co., Norwalk, Connecticut, has been appointed chairman of the Committee on Rubber of the National Research Council of Washington; this council formed by authority of the President of the United States for safeguarding and developing all scientific knowledge of the country for war purposes.

PROVIDING FOR WAR DEPENDENTS.

Most firms are disposed to provide in some fair manner for the dependent families of enlisted men, and the desirability of some uniform system has resulted in a committee of the Chamber of Commerce of the United States to study the matter and make recommendations. F. A. Seiberling, president of the Goodyear Tire & Rubber Co., Akron, Ohio, is chairman.

PENSIONS AND RETIREMENTS.

Several rubber companies have recently adopted a pension plan of retirement as a reward for long, continuous and faithful service. The United States Rubber Co. now takes the lead in announcing that absence for military service will not constitute a break in the continuity of employment on the pension records.

The pension committee, appointed by the Board of Directors May 3, consists of the following: Homer E. Sawyer, chairman, James Newton Gunn, Ernest Hopkinson, H. Stuart Hotchkiss, Theodore Whittelsey, Elisha S. Williams, and Kennedy M. Thompson, secretary.

The Goodyear Tire & Rubber Co. has announced that all employes enlisting for military duty in either arm of the Government service will have their positions kept open for them until their return.

The Dryden Rubber Co., Chicago, Illinois, will pay to any employe who may enlist for active service the difference between the army wage and the average earnings while in the factory.

The United States Rubber Co. has turned over to the Government a portion of its ground floor salesroom at Broadway and

Fifty-eighth street, New York City, for a recruiting office, and its location is a most advantageous one for the purpose.

ENLISTMENTS FOR ACTIVE SERVICE.

Military drill in many establishments has resulted in thousands of patriotic enlistments in the regular army or navy, the National Guard, Reserve, and Home Guard.

Over 160 employes of the Boston Woven Hose & Rubber Co., Cambridge, Massachusetts, intend to enlist and 30 have already done so. A uniformed Home Guard is also being organized. George E. Hall, vice-president, and J. W. Fellows, factory manager, are members of the Public Safety Committee, and James H. O'Brien, superintendent, has joined the Home Guard.

Several employes of the Bucyrus Rubber Co., Bucyrus, Ohio, will enter some branch of military service. C. P. Mader, secretary, is a captain in the Quartermaster Officers Reserve Corps, and chairman of the military committee of the Bucyrus Chamber of Commerce.

Military drill during working hours has been established for 150 young men in the employ of The Cupples Co., St. Louis, Missouri.

Arthur H. Leavitt, assistant sales manager of the motor truck tire department of The B. F. Goodrich Co., Akron, Ohio, has resigned that office, having been appointed captain in the Quartermaster's Reserve Corps, and has already reported for duty at Fort Sam Houston, Texas.

Drew McKenna, for 15 years with The B. F. Goodrich Co., Akron, and later with Charles E. Wood, rubber broker, New York City, has received his commission as lieutenant of the Officers Reserve Corps, and is now on duty at Plattsburg.

Two sons of H. A. Astlett, the New York rubber importer, are serving in France with the Harjes-Norton section of the American Ambulance Corps. Hugh S. Astlett has been there since January and Eric A. Astlett sailed in April.

E. W. Dunbar, superintendent of the Apsley Rubber Co., Hudson, Massachusetts, is chairman of the local Public Safety Committee. The Apsley factory has been placed at the disposal of the Government.

Classes in military training have been arranged by The Goodyear Tire & Rubber Co., Akron, Ohio, giving all employes an opportunity to drill under the direction of ex-army officers.

P. J. Kennedy and R. T. Riddington, of The Fisk Rubber Co., Des Moines, Iowa, are giving lessons in tire repair to members of the National League for Women's Service. These classes are being well attended.

THE RESERVE OF SKILLED MEN.

In order to insure the services of skilled men in manufacturing material for military use, a nation-wide canvass of the industrial resources of the country has been conducted by the Naval Consulting Board. Thousands of men have enlisted in the Reserve and pledged themselves to work at their respective trades for the Government whenever called upon to do so.

Among those so listed may be mentioned 2,000 employes, 400 shop men and 40 in the testing room, engineering and office forces of the Cutler-Hammer Manufacturing Co., Milwaukee, Wisconsin. A. W. Berresford, general manager, is a member of the Naval Consulting Board.

Fully 1,000 employes of The B. F. Goodrich Co., Akron, Ohio, have also joined the Reserve.

MOBILIZATION FACILITIES.

The employes of the Fisk Rubber Co., Chicopee Falls, Massachusetts, have offered their 45-acre athletic field for mobilization purposes, and the company will provide another field for their use elsewhere.

The touring bureau of The B. F. Goodrich Co. has carefully mapped, logged and guide-posted every important road in the United States and this is considered an important factor in case of need of rapid transportation of troops and supplies.

RED CROSS SUPPORT

With the financial support and cooperation of the officials of the Tyer Rubber Co., Andover, Massachusetts, every department of the factory is now sending a substantial contribution to the Red Cross. Mention is made elsewhere in this number of the enthusiastic meeting at Akron, Ohio, at which Captain E. E. Buckleton told of his experience at the front. It is reported that over 1,500 persons joined this society in Akron within the last two months.

The Fisk Rubber Co., Chicopee Falls, Massachusetts, has given to the Medical Corps a fully equipped ambulance, to be kept at the Corps headquarters in Springfield, Massachusetts.

INCREASING FOOD PRODUCTION.

Realizing that the production of an adequate supply of food for America and the nations allied with us in the war against Germany is one of the most serious problems with which we have to deal at the present time, a problem upon the successful solution of which largely depends the result of the war, many firms are heartily responding to President Wilson's appeal. A potato census conducted by a well-known traveling man shows that 90 per cent of the factories in the rubber and allied trades are adding big garden plots for their help.

The Pennsylvania Rubber Co., Jeannette, Pennsylvania, has ploughed and cultivated 60 acres surrounding the plant and turned it over to employes for vegetable gardens. Each employe will plant and care for his own section and receive the produce or profit therefrom.

The Dupont Rubber Co., Fairfield, Connecticut, is having five acres of land plowed where corn and potatoes are to be cultivated. The crops will be sold to the factory employes at cost.

The Van Cleef Brothers, Chicago, Illinois, are offering vacant land adjacent to the factory to their employes for individual gardens.

The Monatiquot Rubber Works Co., South Braintree, Massachusetts, has plowed and harrowed a portion of its vacant land for allotment to employes for cultivation. Much seed has been distributed free and still more furnished at reduced cost.

The Firestone Tire & Rubber Co. is furnishing plots for its employes to cultivate.

The BeSaw Tire & Rubber Co., Hartville, Ohio, has given the use of 50 building lots to its employes for gardening.

Several hundred acres of ground owned by The Goodyear Tire & Rubber Co., Akron, Ohio, not immediately needed for building purposes, have been placed under intensive cultivation, the principal crops being potatoes, navy beans, wheat, corn, peas, etc. Employes preferring this sort of outdoor work for the growing season will be housed in temporary bunk structures. The company is also encouraging home gardens wherever possible. At the Goodyear Cotton Mills, Goodyear, Connecticut, the company offers to plow all gardens worked by employes, free of charge.

Employes of the Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pennsylvania, will raise potatoes this spring on 75 garden plots 50 feet square. The company has plowed the land and the shop gardeners are buying their fertilizer and potatoes on a cooperative plan.

The Fisk Rubber Co., Chicopee Falls, Massachusetts, will plant 6 acres to raise garden truck for use in the company's cafeteria.

USEFUL VACATIONS IN AGRICULTURAL DEFENSE SERVICE.

Under the slogan of "Practical Patriotism" the Food Problem Committee of The Merchants' Association of New York is conducting a highly commendable campaign of enlistment for agricultural defense service in which both laborers and employers are being encouraged to cooperate.

To prevent the possibility of famine next year the world is depending upon American farmers to grow the greatest staple food crops in the history of the nation. Farmers have the land, but lack the necessary labor for planting and harvesting. In most factories, however, are many able-bodied men who lived upon farms in their youth and so are experienced in farm work. Employers are being encouraged to release such men for periods of two or four weeks during the crop season with whole or part pay, transportation and a guarantee of their former positions on their return. Not only is this a much needed and patriotic service to the nation, but self-interest of employers and employes alike should make it clear that abundant crops are essential to prevent excessive food prices and consequent abnormal labor costs which will eventually be felt by everybody in the higher cost of commodities of all sorts. Another aspect of the scheme is also worthy of consideration. Such a period of service, though it means laborious work, provides a change of environment, healthful country air and outdoor activity which cannot fail to benefit any factory worker. It is, indeed, a useful vacation, and one which undoubtedly many rubber workers are well qualified to enjoy.

FABRIC WEAVERS IN LINE.

At its annual meeting held at the Copley-Plaza, Boston, Massachusetts, the National Association of Cotton Manufacturers resolved through a special committee to cooperate in all practicable ways with the food board of the Council of National Defense and the Committee of Public Safety of Massachusetts and other states in the work already undertaken or to be undertaken by these bodies, and to impress upon its members the desirability and importance of their encouraging and helping their employes to cultivate garden plots to supply their own needs at least in part.

TRUE THRIFT.

S. W. Straus, president of the American Society for Thrift, points out that misguided thrift, better described as indiscriminate tight-fistedness, is no less a menace at this critical juncture than wastefulness and extravagance. Thrift must be constructive, not destructive, and to stop the wheels of industry through too great deflection from the usual modes of living would be a calamity. Every individual should do his part to keep money in normal circulation, as it furnishes uses for capital and employment for labor. Economic hardships will be minimized if each person is governed by common sense, prudence and foresight, making legitimate expenditures as usual, avoiding extravagance, and particularly eliminating wastefulness in foodstuffs, because on us rests the responsibility of feeding our allies.

Employes of labor should be courageous and confident in the knowledge that the greater share of our participation in the war must be economic and that the billions being raised for war purposes will eventually revert to the pockets of the people, most of our foreign loans also being immediately spent in this country. America continues to enjoy the greatest period of material prosperity it has ever known.

FLOATING THE "LIBERTY LOAN."

THE INDIA RUBBER WORLD is numbered among the leading trade journals of the country, covering nearly every line of business, which are cooperating with the Government by devoting free editorial and advertising publicity to the promotion of projects for the public good, and particularly in floating the "Liberty Loan."

The time has come for all to serve, and every person whose plain duty lies in continuing his ordinary labors can best "do his bit" financially. Every man, woman and child who can do so should buy at least one Government bond. Not only will it be of assistance in furthering the cause of human rights, but it is a good, safe investment as well and paying a fair rate of interest.

Rubber and allied houses are already performing a patriotic service by calling meetings of their employes, explaining the de-

tails of the loan and securing subscriptions. In some cases the firm negotiates the number of bonds required and gives each person the privilege of paying in ten monthly instalments of \$10 each, interest on the necessary money being covered in part by the interest borne by the bond. This encourages savings for the future and stimulates individual thrift.

The Hood Rubber Co., Watertown, Massachusetts, is doing still better, and has taken active leadership in encouraging other similar firms to take up the matter. At the request of Alfred L. Aiken, governor of the Federal Reserve Bank of Boston, Frederic C. Hood is representing the rubber industry on a committee composed of representative New England manufacturers which is promoting the sale of Liberty Loan bonds as a public duty. Mr. Hood has worked out a plan of campaign for his own factory with printed subscription forms, advertising matter descriptive of the bond issue and the desirability of participating, and a plan enabling every employe to invest on easy payments. Under this plan the company negotiates the total number of bonds required and operatives pay \$2 down and \$2 a week for 24 weeks for each \$50 bond, the firm assuming the interest on the necessary money and the investor having the entire interest ac-

cruing on the bond. Financial experts have addressed the Hood operatives on the importance and benefits of investing weekly savings in this manner.

About 275 letters have been sent to rubber and allied firms in the first Federal district of New England, enclosing samples of the printed matter and urging them to adopt the same or a similar plan, organizing the sale under the direction of one man in each factory, who will devote his time to this work until the closing date, June 15. Each firm will, of course, deal directly with the Federal Reserve Bank, the only interest of the Hood Rubber Co. being patriotic cooperation with the government and a desire to tabulate the results accomplished. Many favorable replies are being received and the project promises to be successful.

A list passed around the general offices of The B. F. Goodrich Co., Akron, Ohio, received over 100 signatures of persons obligating themselves to buy Liberty bonds, and since then many employes in all departments have added their names to the list. The Fisk Rubber Co. has notified all employes who wish to purchase these bonds, that it will loan 80 per cent of such subscriptions, allowing payment to be made at 2 per cent per week.

Two Years in England in War Time.

By Arthur E. Friswell.

WHEN war broke out I was living in Bermuda, taking a semi-rest from over 20 years of strenuous work in rubber manufacturing. Only a semi-rest because amongst other light occupations I was the agent for David Moseley & Sons, Limited, of Manchester, England, over whose tire department at their factory in Manchester I had been manager some years previously. The war stopped practically everything in Bermuda except the climate, which, I am informed, still continues almost ideal and undisturbed. Wishing to re-engage in rubber work after my rest, and thinking that there would be plenty of openings in England, I went there. Theoretically, there should have been any amount of scope. Actually, there was, and is not. Almost every rubber factory came under government control early in the war, the government taking the bulk of the output for military and naval needs. It was useless for manufacturing firms to pay traveling expenses to secure orders which they could not execute, yet most firms have valued representatives whom they do not wish to lose, and they have been given temporary office, staff or departmental positions for the duration of the war; hence a surplus of staff. Many of the actual operatives, the actual producers, enlisted; many rushed into better paid government munition work. Hence a shortage of labor and an altogether anomalous condition of affairs. Firms which had started to build, were compelled to leave foundations and walls as they were, for want of builders and of building materials. Meanwhile, American manufacturers with well-stocked warehouses in Great Britain reaped a temporary harvest, as they were permitted to secure and execute orders denied to the British manufacturer. Government work pays well, and, while it lasts, the British manufacturer has no cause for grumbling; but, it cannot last indefinitely, and British firms soon realized the danger of their home market slipping away from them. Restrictions of importations, particularly of motor-cars and their accessories, quickly hit the foreign competitor. It is safe to say that the war has opened the eyes of British manufacturers to the weaknesses of their one-sided free trade theory more than the previous 20 years or so of tariff reform propaganda, and more than another 20 years of such propaganda by itself would have done.

The Imperial Conference recently held in London between members of the British Cabinet and British Colonial Premiers

is hailed as welding the hitherto loose links of Empire, yet only a few years prior to the war, when such a conference was suggested, Winston Churchill, speaking for the government as a responsible cabinet minister, said that "The door was locked, bolted and barred" against what was regarded by the government as a purely fantastic suggestion. So has the sledge-hammer fact of war changed opinions and theories. When the Chamber of Commerce of Manchester, the very home of free trade, passed a resolution by an overwhelming majority throwing free trade overboard, that policy of buy cheap, regardless of real cost, went into the limbo of things lost.

This is not an academic discussion. It directly affects American manufacturers who desire to secure or retain a share in the markets of Great Britain, and I am firmly convinced that they can do so hereafter only by actually manufacturing in Great Britain. This I think they can do successfully. With their alert methods, their greater willingness to change and improve processes, their more generous conception of wage paying and their more elastic idea of interchange of ideas than the very good, but very conservative Britisher holds, Great Britain should be a very profitable field for the American manufacturer, and the British manufacturer would not resent such competition waged on his own ground, employing British labor and paying British taxes fairly and squarely with himself. All this is, of course, for the war after the war.

For some months I represented an English rubber firm in their Sheffield branch, and a few months ago cutlery manufacturers there were almost begging for what they term razor scales, which are the coverings for razor handles and for knife and fork handles, these coverings being made of ebonite, or hard rubber. The supply was then extremely limited, the demand practically unlimited. Materials previously used for the purpose—bone, ivory, fiber, etc.—were almost unobtainable. I cannot say to what extent the recent restrictions of cargoes might affect the export from this country, but I know that such ebonite articles were (and probably still are) urgently wanted. Some of the largest makers of cutlery were eager to place contracts for three years to cope with government orders alone.

Pending consultations with some of the leading rubber firms in Great Britain, I engaged in war work in various parts of the country, and came into direct contact with the quiet, but very

determined war spirit and its actual productive activities. The deadly, thorough earnestness, the utter carelessness of cost, is remarkable. The output is staggering, literally prodigious. Great Britain is one vast arsenal. Scarcely a village, town or city possessing a workshop or any half-way suitable machinery is not working day and night to feed the insatiable mouth of war. And all, under a deceptively superficially calm exterior. The British have tackled the job as though it were to last forever, and that is their temperament. The ingenuity and efficiency of American machinery is everywhere in striking evidence. For years prior to the war, there was conflict between capital and labor. The one paying as little, the other doing as little as possible. The war has given labor the upper hand. It is decidedly the "top dog." As Minister of Munitions, Lloyd George gave to the trades unions practically all they demanded, including rates for work which may be increased, but cannot be reduced, and members of trades unions are reveling in such prosperity as they never expected. In many directions wages paid now are as much in excess of actual value received as prior to the war they were inadequate.

Female labor has come into its own at a bound, women are doing men's work and doing it well in every imaginable direction, in workshops, on the farms, as postmen, railway workers, van drivers, window cleaners, clerks—at almost everything, in fact. I am not sufficiently conversant with industrial and political economy to forecast the results after the war, but anyone with half an eye can see that the suffragettes have won by sheer merit, and that woman will never again be relegated to the cramped industrial conditions of pre-war times.

When Tommy exchanges his rifle and bayonet for the tools of his proper trade, there will be trouble to tax statesmanship before a *modus vivendi* is found, and the hide-bound conservatism of British capital and the "ca-canny" silliness of British labor will both have to yield to some sort of mutual understanding more nearly approaching national common sense.

I have seen Zeppelins plying their devilish trade and the after-effects, which were reported quite truthfully, officially, as of "no military importance," but the damage, aside from military importance, was very real. I saw one brought down in two parts in flames. It was a good display of fire works and produced just about the same effect on the very unemotional crowd which witnessed it. I do not think any more of them will visit the British Isles. Their visits and their reception are rather too costly. The English are an extremely patient, dogged people, and after two years with them one is compelled to feel that they possess the quality to win. They feel very grateful to the United States, and I do not think they could have sent to the people and to the government of this country a finer exponent of themselves than Mr. Balfour. I have had the pleasure of meeting him while I was working in Northeast Manchester, for which constituency he was then member of Parliament. A ripe scholar, a preeminent statesman, a sincere polished gentleman.

My return crossing on the "St. Paul" was without incident, except that there were aboard the survivors of officers and crews of four American vessels that had been either torpedoed or shelled in South American waters, in the Mediterranean and off the coast of Scotland. Their experiences had not perceptibly affected their spirits, although some had spent 30 hours in open boats. They are going to sea again as usual. Some of them perhaps once too often. Neither they nor the British sailors I have met attempt to minimize the U-boat, but all feel that invention will beat invention and very soon, and there are rather more than official hints to that effect.

SPECIAL TIRES FOR MILITARY TRANSPORT.

In a recent contribution to a German motor paper, an authority on motor vehicles expresses his admiration of the transport organizations which contributed so much towards the success of

the Allies in the Caucasus. After discussing the general construction of the cars used, he describes the special tires. These were band tires with cylindrical air chambers and were of special breadth and thickness, which, besides permitting quick running, prevented skidding in case of punctures. The tires also had the added advantage, that they could stand overloading of the trucks.

CAPTAIN BUCKLETON TALKS.

CAPTAIN ERNEST E. BUCKLETON, known to the rubber trade of two continents, at the urgent solicitation of the Red Cross has been induced to talk of his experiences at the front.



CAPTAIN ERNEST E. BUCKLETON. continent seemed to be showering on top of me.

I suppose they must have dug me out. The next I knew I was in a hospital bed with one of those angels of mercy caring for me. There were deep dark rings about her eyes—I afterward found that she had hardly sat down in 48 hours—but there was a smile on her lips and a cheery, bucking word for me. And I must have been a pretty horrible looking specimen, too, what with my heart and stomach all distended out of human shape, and my face that rotten green from the poisoned gas fumes.

Bless those Red Cross nurses, with their brave hearts and their souls too big for their bodies! In all the time I was in the hospital I never heard a murmur of complaint. They were always ready with a smile, a little joke, a cheery greeting, or some tender ministrations; and this in spite of the fact that they were working, many of them, 24 hours a day, amid scenes of horror that beggar description—laboring over men so frightfully mutilated that seasoned army surgeons turned sick.

Your American Red Cross nurses and workers have done wonders. Without them we would have had a tough bit of a time getting along. Your American hospital in Paris is the most efficient of all the war hospitals and your surgeons are marvels. Not the least of the American Red Cross work has been done in the prison camps of the various countries. They have seen to it that the prisoners got better food and better housing, and they have practically eliminated those scourges of prison camps typhus, typhoid, scurvy and cholera. Every soldier is looking forward eagerly to the time when tens of thousands more of your plucky American women will be wearing the familiar habit.

Boost for the Red Cross! Wouldn't you?

Captain Buckleton was enthusiastic over the sending to France of nine regiments of American railroad engineers. He declared:

They will be of inestimable service. No one realizes how badly we need more railroads to transport materials and food to the front. It will be a fine thing for your new army, too, for these men will have an opportunity to get hardened to the nerve-racking task of working under fire, and so be able to help train new contingents as they arrive.

The moral effect of the Stars and Stripes can't be overestimated. I would like to be present if they decide to send a part of the contingent through Paris. Talk about an ovation!

COPY OF INDEX TO "Rubber Machinery" will be sent free upon request.

Italian Aircraft in the War.

AIRCRAFT activities in warfare are now numerous and varied. Airplanes examine the battlefields minutely to discover the enemy's defenses and traps, which are recorded and mapped photographically. By means of these records and in conjunction with kite and captive balloons, artillery fire is directed and infantry columns led to victory, while both airplanes and dirigibles, like cavalry raiding parties in open warfare, often travel far over enemy territory and find targets for bombs along communication lines and in supply depots.

Balloons of every sort have been of inestimable value in the unique mountain warfare being waged by Italy, while airplanes are employed in great numbers as on every European battle front. Several different types of airplanes are in use, each to perform its special task. There are Farman and Voisin machines for reconnoissance, Caproni machines for bombardment, Farman and Caudron types for artillery squadrons, and light, active Nieuport machines for fighting and pursuing hostile aircraft, while hydroplanes are used at sea.

The well-known firm of Pirelli & Co., Milan, Italy, enjoys a practical monopoly of all rubber manufactures for the Italian Government, has turned out large numbers of captive balloons for the army, and also supplied considerable quantities of balloon and airplane fabrics to the allied countries. In this great establishment, one of the largest in Europe and employing several thousand persons, the directors of the business are known for their progressive tendencies in experimenting with new rubbers, machinery and processes. There is probably no article of rubber, gutta percha, asbestos or balata which is not made to-day by Pirelli & Co. Tires, footwear, soles, waterproof fabrics, surgical, sporting and hard rubber goods are all important lines, and this firm was the first in Europe to compete with England in rubber thread and the making and laying of submarine cables.

Thousands of miles of cables have been laid for the Italian and Spanish Governments and the maintenance of many laid by England has been assumed. Power cables over the Andes in South America, and for distributing the enormous power at Niagara Falls, are considered among their most spectacular achievements. To facilitate this work large branch factories are in operation at Spezia, Italy, Southampton, England, and near Barcelona, Spain. All of this experience fitted them notably to assist their government when war was declared.

At present the firm's output is chiefly of a military character and the family which owns and directs it is placing its services unreservedly at the command of the nation. While Dr. Alberto Pirelli is under government orders in charge of Italian army construction work in his factory, several departments of which have been militarized, his three brothers have all joined the colors. Piero Pirelli, also a managing partner of the firm, is attached to the staff of the commander-in-chief, another brother is in a cavalry regiment and the third has joined the aviation corps.

Cooperation and coordination in war manufacture are now in order as never before, and as Italy has become an ally of the United States equally with England, France and Russia, it is likely that the big rubber companies of America might obtain practical information from Pirelli & Co. that would be of great service in the manufacture of balloons, "blimps" and other dirigibles of larger size. Dr. Pirelli visited the United States for several weeks in 1908, when he met many of our leading rubber men.

It will be remembered that George A. Pirelli, one of the firm, spent several months in the United States about a year ago and called on the various supply and machinery houses and also visited the principal rubber mills of the United States and Canada, returning to Italy late in the fall.



ITALIAN CAPTIVE BALLOON ASCENDING

before, and as Italy has become an ally of the United States equally with England, France and Russia, it is likely that the big rubber companies of America might obtain practical information from Pirelli & Co. that would be of great service in the manufacture of balloons, "blimps" and other dirigibles of larger



WORKING FORCE OF PIRELLI & CO., MILAN

Trapping Dollars.

COAL costs money. Its value is based on the big round American dollar. The ordinary manufacturer runs much steam into the open air and it is wasted. Every unit of heat which can be returned to the boiler after the steam has done its duty is just so much money saved.

Steam traps collect and discharge the hot water of condensation from any system where steam is used, without allowing steam to escape, and are cheap and efficient money savers.

Where the hot water of condensation is free from grease or any other impurities, it is generally returned to the boiler either directly or indirectly, depending upon the system, thus saving the contained heat. This amounts to the equivalent of approximately five to ten per cent of the coal burned.

In rubber mill work there is exceptional opportunity for reclaiming the hot water of condensation, where so much steam is used for manufacturing purposes, such as in heaters, vulcanizers, presses, in heating buildings in the winter season, etc.

When a vulcanizer, for example, is located at a distance from the boiler more or less trouble will be experienced from condensation which comes over with the steam. If this heat-reducing water is promptly removed by an efficient steam trap there will be no delay in heating up and the desired pressure will be maintained with certainty. Thus time is saved and the danger of flooding the heater eliminated. Many tires have been under-cured due to an inefficient steam trap and the consequent submersion of the molds in the heater by water of condensation.

This difficulty may be overcome by the use of a reliable steam trap piped to the main steam supply line at a point where the accumulated water will flow to the trap by gravity and the trap will, with the aid of steam pressure, force the water of condensation out of the trap into a receiver or back into the boiler, thus saving the hot water which otherwise would be allowed to go to waste.

A very common trouble with steam traps is caused by low places or pockets in the piping system. Water accumulates in the low spots and is forced through into the trap at intervals, causing an uneven discharge. Where the quantity of accumulated water is sufficient and the steam valve in the line is opened suddenly this water is forced through the pipes at such a high velocity as to cause a water hammer which is very destructive to the whole piping system.

The principal traps in use are siphon traps, float traps, bucket traps and expansion traps. These in turn are sub-divided into special traps, such as return traps, vacuum traps and others designed for special purposes.

SIPHON TRAPS.

Siphon traps, the simplest, are constructed according to the well-known siphon loop principle, consisting of two lengths of

pipe with a return bend. These are used for low-pressure work and more for controlling pressures within the system than for discharging under atmospheric pressure. When the pressure does not rise above 2 or 3 pounds, a trap is used which acts on the siphon principle, but is constructed on different lines that permit sinking it in the ground.

It is considered good rubber mill practice to use separate traps on each unit, particularly the larger machines; however, a line of presses operating at the same steam pressure may be satisfactorily served by a trap on the main steam supply line. Any well-made trap of proven capacity of either the float or bucket type may be used in connection with high-pressure steam. The

former depends on a float for operating the discharge valve, while in the latter the buoyancy of a floating bucket is overcome by the inflowing water which opens the valve within the bucket when-

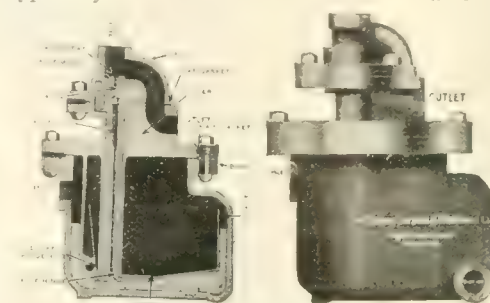


FIG. 2. STRONG TRAP.

ever it is discharged. The following are typical bucket traps.

BUCKET TRAPS.

In conjunction with vulcanizing presses for mold work, the bucket-type steam trap is generally recommended. If the steam pressure is the same for each press, it will be possible to operate several presses on one trap of suitable size, but five presses operating at 80 pounds and five at 60 pounds, for instance, would require a separate trap for each group. Sometimes the trap valve is opened or closed to increase or decrease the circulation speed, and in this instance an individual trap is preferable.

In Fig. 1 is shown a sectional view of the well-known Squires bucket steam trap. It has one inlet, two outlets and two blow-off connections. The pipe connections can be made on either side, whichever may be most convenient, leaving the other side plugged. After installing the trap there should be enough water in it to float the bucket, as the valve does not seat until the bucket is up. As soon as sufficient water enters the trap, the bucket, being buoyant, rises and closes the valve, which is attached to it by the valve stem. When condensation in the trap body has reached the high-water line the bucket fills and sinks, opening the valve which discharges the water in the bucket, leaving enough to insure a perfect water seal, together with the condensation in the trap body through the valve port to the outlet until it has reached the low-water line.

Another bucket trap, known as the Strong trap, is shown in Fig. 2 and, briefly, consists of an open bucket hinged at one side. When it becomes partly filled by the water overflow from the trap, it tilts to the right, opening the valve located at the top, and the water is discharged

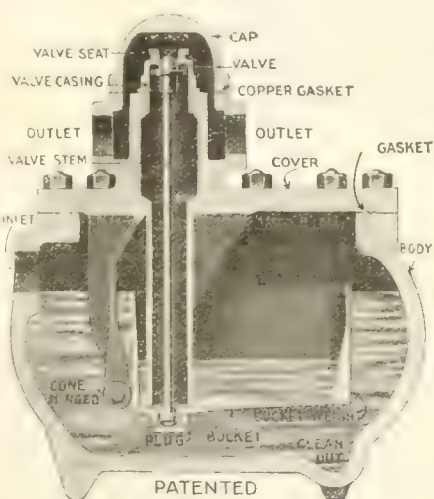


FIG. 1 SQUIRES BUCKET TRAP.

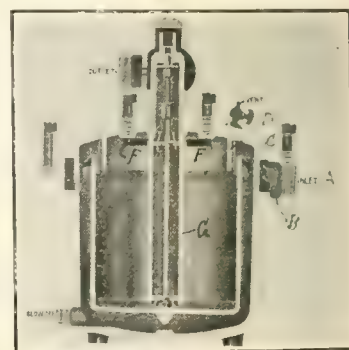


FIG. 3. STICKLES TRAP.

from the bucket into a tank from which it is pumped back to the boiler. This trap will discharge the water twice as many feet higher than the trap as there are pounds of steam pressure at the trap.

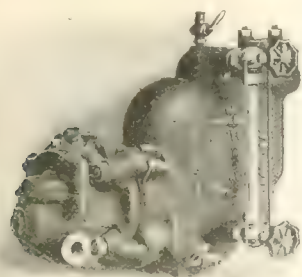


FIG. 4. ANDERSON TRAP.

In the Stickles bucket trap, shown in Fig. 3, the water enters the inlet *A* through the chamber *B*, which contains four ports *C* leading into the trap proper. As the four ports are at the top of the chamber even with the top of the bucket, it is possible to maintain the water surrounding it at the full height of the bucket. The discharge of water into

the trap when it is in operation, or open, is across the top of the bucket line. This action prevents water that floats in the bucket from being blown out.

Water and steam upon entering the trap come in contact with a baffle or separating ring *D* which throws the water downward and the steam upward, the steam entering the upper port *F*. Thus the steam and water are separated as they enter the trap while the discharge is taking place and water is discharged instead of steam and water.

The water passes out through the large pipe *G* in the direction of the arrows, but sufficient water is left in the bucket when the valve closes to form a water seal, and steam will not blow out at the end of the discharge. The force of the water on the wings of the valve when it is discharging assists in closing the valve quickly.

The valve rod, made with a flexible joint, connects the valve with the bucket, the flexible joint allowing the valve to seat squarely. When large volumes of water are to be handled the trap is fitted with double-ported valves.

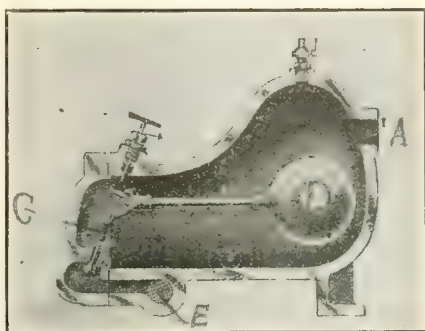


FIG. 5. WATSON & MCDANIEL TRAP

FLOAT TRAPS.

Vacuum chamber dryers, vacuum rotary dryers and fabric dryers used by rubber manufacturers and reclaimers for drying rubber and fabrics are generally equipped with float traps. It is necessary to have an individual trap on the steam line from each separate dryer; otherwise there will be back-pressure and the condensation will not drain properly; moreover, a float trap which has a greater capacity than is actually needed in order to take care of any variation, is usually specified.

The Anderson trap shown in Fig. 4 is a typical float trap, and its operation, briefly described, is as follows:

The condensed water enters the trap at the point marked "Inlet" and when sufficient has accumulated to seal the valve with at least three or more inches of water, the float then rises and opens the valve, allowing the condensed water to escape at just the right rate to take care of the amount entering the trap, thus maintaining a water seal at all times.

The trap may be connected to several dryers with good results, provided a uniform steam pressure is maintained at all times. It is always advisable when making up a connection of this kind to run the several drips into a large header and attach

the trap to the header, which has the effect of equalizing the pressure to a certain degree and produces better results.

When the pressure varies to any extent in the dryers the one having the highest pressure will discharge freely and back up into those having a lower pressure, and the best results can be obtained only by attaching separate traps to those having lower pressure.

After the trap has been in use a short time it is advisable, especially on new piping, to unscrew the sediment strainer and

remove the accumulation of scale and chips.

In the sectional view of the Watson & McDaniel trap, shown in Fig. 5, the water is discharged as fast as it reaches the trap. It has a large valve

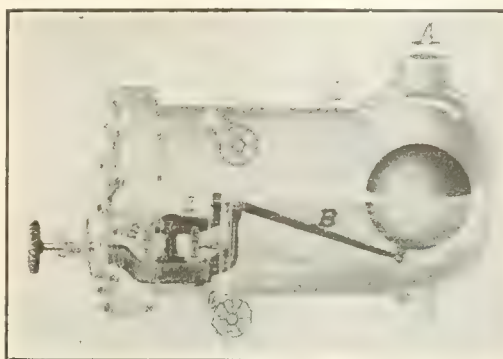


FIG. 6. DAVIS TRAP.

outlet at the bottom, the valve of which is operated by a copper float.

The water of condensation enters the trap through the inlet *A*. The valve disk seats against *B* on the under side, and against the pressure in the trap, and being away from the bottom of the trap does not choke up with sediment. The valve stem *C* is operated by the float *D*, and as the water rises in the trap body the float lifts, moving the valve disk away from its seat, when the steam pressure on the water will force the water out of the trap body through the valve seat *B* and out of the discharge outlet *E*. As the valve is practically balanced the weight of the float is sufficient to overcome the pressure on the valve.

Another trap that operates on the same principle as the foregoing, and is illustrated in Fig. 6, is the Davis trap. It is, however,

equipped with double cone-shaped balanced valves, which are operated by a copper float. The valves are always sealed by water which prevents leakage of steam when the trap is discharging. As the valves are balanced

the trap operates equally well under high, medium or low pressure without adjustment. As there are two valves, the trap is of twice the capacity of a single valve trap having the same valve area of one valve. The valves are cone-shaped and do not readily stick.

The water of condensation enters the inlet *A*, and as the water increases in height in the body of the trap the float lifts, carrying the lever *B* with it, which in turn moves the rocker arm *C* and forces the valve *D* down and the valve *E* up from the seat.

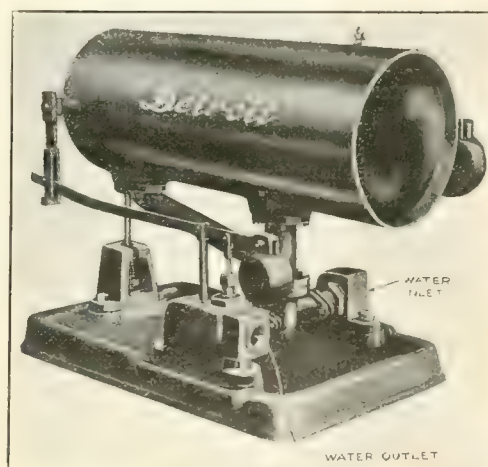


FIG. 7. DETROIT TRAP

The water is then discharged past the valves and out through an outlet at the side of the trap, not shown.

The Detroit separating trap illustrated in Fig. 7 differs from the others in that the working parts are all on the outside and therefore easy of access and observation. It is not dependent upon the buoyancy of some hollow float, or the contracting or expanding of certain parts, but simply upon the weight of the water in the tank acting against the counter balance weight, to open and close the outlet valve. There is absolutely nothing inside the tank. These traps have large capacities and are quick to act.

EXPANSION TRAPS.

The Sarco, shown in Fig. 8, is a good example of this type of trap and is recommended for its extreme simplicity, being operated by an expansible fluid that controls the valves.

It consists of a steam pipe body which can be screwed on anywhere in a steam main or pipe, occupying very little space and taking the place of an elbow or bend. In this body a Sarco

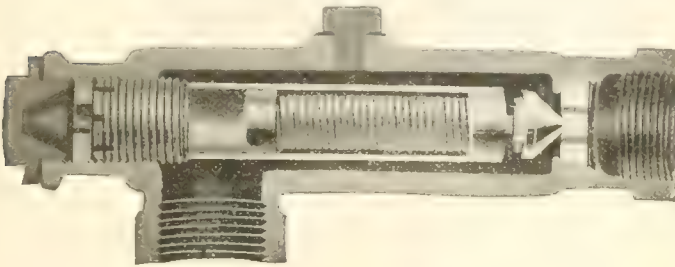


FIG. 8. SARCO EXPANSION TRAP.

cartridge is inserted, containing an easily expansible fluid operating a corrugated, hermetically sealed, tombac tube, to the lower end of which is attached a piston, which carries the valve head.

The trap is placed in position and the cartridge unscrewed a few turns. When the steam has heated up the cartridge, expanding the fluid and forcing out the piston, the cartridge is to be gently screwed forward until the valve head meets the seat, closing off the steam. The adjustment can then be locked and the trap works automatically. As soon as water collects, the liquid contracts and the valve opens. The condensation is then ejected by the pressure behind it, and immediately the steam comes into contact with the cartridge; there is an expansion and the trap closes.

All of the above traps are separating traps, designed primarily for draining high or low pressure steam mains, vulcanizers, receivers, and steam separators. Their office is to hold the steam in check and at the same time return condensation to the feed water heater or hot well, but not to the boiler.

RETURN TRAPS.

Direct return systems are used to automatically return the condensation directly to the boiler without loss of heat, also to remove the air. The Detroit systems comprise the single system when high pressures are dealt with, the double system for low pressures, and the combination system when exhaust steam is used for heating in the day time and live steam at night. These systems require different installations, and tilting traps with outside working parts are designed to meet special requirements of the engineering problems.

The following brief description of the Detroit return trap will explain the operating principle of this device.

Referring to the illustration in Fig. 9, the water enters the right hand bearing through the inlet check valve, passing up into the tank through the hollow trunnion and discharging, then leaving by the same path, only through the outlet check valve. The tank becoming two-thirds filled, its weight offsets

the counterweight, and on account of the tank being supported off center, it has a downward action on the tilt end. This tilting action is for the purpose of opening and closing the steam and air valves in the right hand bearing. When the trap is filling, the steam valve is closed, but when discharging it is opened to allow a pressure in the tank to force the water out. The air valve is opened when the tank is filling and closed while discharging. Both the steam and the air pass through the upright pipe inside the tank by way of the right hand half of the hollow trunnion.

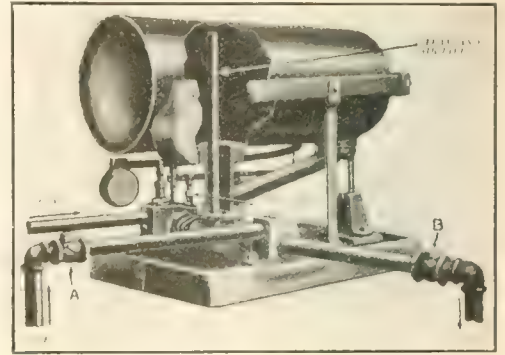


FIG. 9. DETROIT RETURN TRAP.

A return trap of different design, illustrated in Fig. 10, is the Pratt & Cady trap. It consists of a body containing a float *A* which actuates a lever *B* which in turn operates the rocker arm *C*. On the outer end of the lever *B* is a weight *D* which counterpoises half of the weight of the float. The rocking lever *C* has a weight *E* which rolls to each end alternately as the feeder fills and is emptied of water. The rolling ball acts at exactly the same point every time to open and close the steam valve *F*. The rod *G* connects the lever of the valve *F* with the rocking lever *C*.

In operation, water enters the inlet pipe and lifts the float *A*, which causes the lever *B* to move downward at the outer end. This movement is imparted to the rocker arm *C* by the pin and catch block. When the movement of the rocker arm *C* is sufficient, the ball *E* will roll to the opposite end from the position shown, which suddenly tilts the arm *C*, giving the lever *G* a pull which opens the steam valve *F*. This admits steam at boiler pressure into the trap and the water is forced out through the discharge pipe.

When the water is lowered sufficiently in the trap the float causes the outlet of the lever *B* to rise until its motion has caused the rocker *C* to tilt in the opposite direction, when the ball will return to the position shown, closing the steam valve with the same sudden motion with which it was opened.

The Bundy tilting trap is designed to handle water of condensation at high temperature from coils or other sources when it collects and returns it to the boiler.

The trap is designed as shown in Fig. 11. The yoke is made with an extension on the upper side, so that the yoke approaches a ring in shape, as shown in the semi-sectional view, Fig. 12. The upper section of the yoke is connected to a discharge valve operated by the tilting of the bowl in unison with the lower or steam valve. The latter has a vent, as shown in Fig. 11. Referring to Fig. 12, water enters the trunnion *A* in the direction of the long arrow. Live steam is admitted to the bowl through the valve *C* and the left passage of the hollow trunnion.

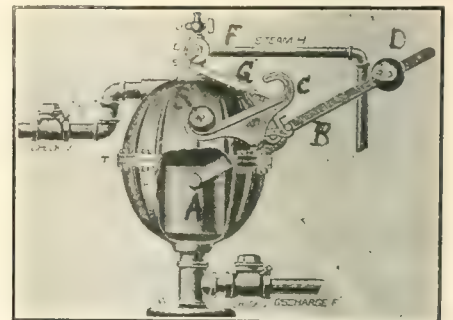


FIG. 10. PRATT & CADY TRAP.

The discharge water passes from the right trunnion in the direction of the short arrows to the discharge valve *B*; the same trunnion is used for the inlet and discharge water. In operation the water to be handled is returned to a receiver and flows by gravity to the bowl of the trap through a check valve. When the bowl is full of water it tilts to its lowest position, which action opens the steam and discharge valves. Live steam, therefore, rushes into the bowl and the water, being under steam pressure, is forced out through the inlet passage, but, being prevented from returning to the receiver by the check valve, passes through the upper part of the yoke, the discharge valve and the discharge pipe.

As soon as the water has been discharged from the bowl the weight brings it back to the filling position, which action closes the steam and discharge valves, when the cycle of filling and discharging is repeated.

The Morehead design of tilting return traps is shown in Fig. 13. This trap receives water of condensation and automatically delivers it to the boiler at practically the temperature due to the pressure at which the steam is condensed. The steam pressure is admitted to the surface of the water in the trap and is automatically shut off before the trap tank is empty. The steam used is only such as is condensed by the latent heat passing from it to the water in the tank and all is returned to the boiler.

Referring to Fig. 13, the water enters the trap through the inlet pipe in the direction of the arrows pointed toward the center through the water end of the trunnion *A*. The opposite trunnion holds the steam admission valve which regulates the steam supply. The tank is counterbalanced by a cast-iron counterpoise weight on the end of a wrought-iron lever. At the point of application of this valve lever to the tank, an extension rod engages with a lever controlling the steam valve.

Just under the ends of the tank are two upright buffers which limit the swing of and provide resting points for the trap in its filling and discharge position, thus removing all weight from the trunnion packing.

The trap tank is maintained in a horizontal position by the weight lever, and when sufficient water has entered the trap to overcome the action of the lever, the tank will tilt downward, automatically opening the live-steam valve, admitting steam at

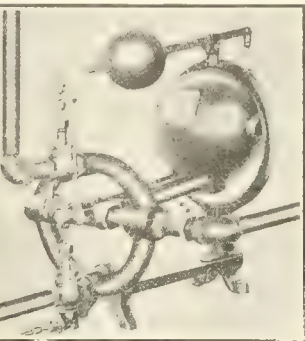


FIG. 11 BUNDY TILTING TRAP.

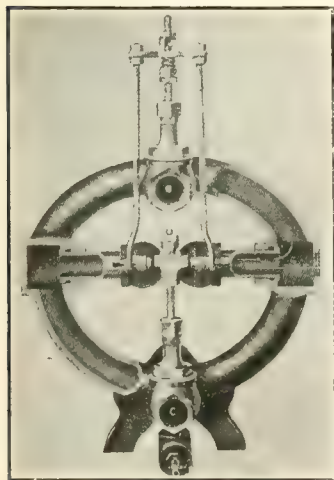


FIG. 12. ARRANGEMENT OF TRUNNIONS AND VALVES BUNDY TRAP.

boiler pressure above the water. The pressure in the tank then forces the water out of the rear connection through the water trunnion and discharge pipe to the boiler. When the tank is relieved of water the weight tilts it back to its original position, and the filling and tilting action is repeated.

VACUUM TRAPS

Vacuum traps are used for drying vacuum lines or any ap-

paratus working under a vacuum. The Detroit vacuum trap, shown in Fig. 14, is always placed at the low point of the heating system and receives the condensation by its vacuum, lifting it to the return trap on top of the boiler. In operation, when the vacuum trap fills it tilts downward, the live steam valve is opened, which allows a pressure on the trap above the water. This pressure forces the condensation up to the return trap on top of the boiler. This upper trap receiving the water, fills and tilts forward, opening the live steam valve. Thus the trap pressure being equal to the boiler pressure, the water by the law of gravity flows into the boiler, due to its position several feet above the water line. When the traps have emptied they automatically return to a filling position, closing the live steam valve and opening the air vent valve on the upper trap and the cold water valve on the vacuum trap.

Another vacuum trap, known as Winter's, is illustrated in Fig. 15. One end of the trap body is fitted with a removable head and secured by bolts, as shown. Connected to the top of the trap is a swing check-valve *C*, opening toward the trap. A discharge pipe carrying an outlet check-valve *D*, which swings away from the trap, is connected to the bottom. In the chamber below the pipe *N* is a bronze bushing *L*, containing a piston valve *A*. Internal ports are so placed in the valve chamber that they communicate with two sets of radial ports *B* and *G*, in the bushing, the port *M* being in communication with the pipes *N* and *O*.

The pipe *N* connects with the pipe to be drained, and *O* with the atmosphere.

The piston valve is attached to one end of a valve-stem, the movement of the valve being limited in one direction by the head of the bushing, and in

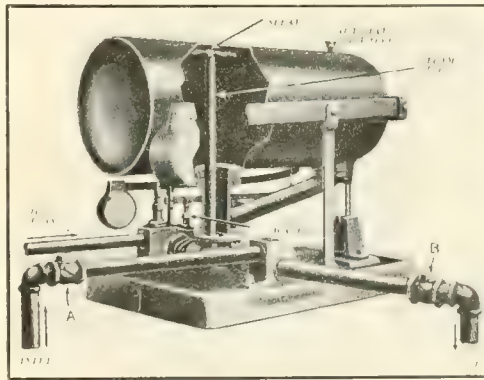


FIG. 14 DETROIT VACUUM TRAP.

the other direction by a socket nut screwed on the valve-stem and working in a socket, as shown, at the right of the adjustable disk *J*; the valve stem also carries the adjustable disk *J*.

There are two inward projecting brackets, *P* and *Q*, the first supporting a shaft *R*, upon which is loosely mounted a rocker with which is connected one end of the link *S*, the other end being connected, by means of a pin at *T*, on the lever carrying the ball-float *K*, which imparts a rocking movement to the lever when the water level in the trap varies. On the shaft *R* a hammer or lever of unstable equilibrium is mounted, the upper end of the hammer having two arms which straddle the valve-stem. The rocker is provided with two toes *E* and *H*, which engage the hammer, thus giving the necessary valve movement.

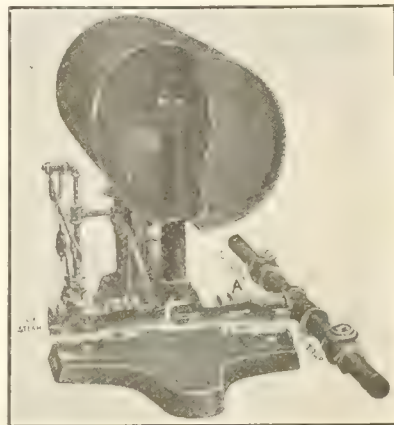


FIG. 13 MOREHEAD TILTING TRAP.

The operation of the trap is as follows: With the parts in the position shown, which will be the case when the trap contains the maximum volume of water to be discharged, the action of the float will shift the valve *A* to the position shown; the port *B* communicating to the air or steam pipe is open and the air rushes in and destroys the vacuum in the trap and holds the inlet valve *C* to its seat, while the outlet valve *D* opens by gravity and permits the accumulated water to escape. When the float begins to lower, due to the falling water level, the toe *E* of the rocker will move to the right and, by contact with the yoke of the hammer, will shift it in the same direction. When the hammer passes the dead center it falls to the right and strikes the disk *F* with sufficient force to move the shaft and valve stem to the

right, thus closing the port *G*. This operation once more est-

ablishes and maintains a vacuum until the water of condensation reaches such a level as to cause the toe to move to the left and again shift the hammer, causing it to fall to its first position. Contact with the disk shifts the valve stem and valve, closing the port *G* and opening the port *B*.

when the vacuum is again destroyed and the trap again emptied of water.

No live steam is required to operate the trap, unless the discharge is to be elevated above the trap. There are no stuffing-boxes nor trunnions and but one valve.

As a final word it is necessary to call attention to the importance of proper pipe connections in the installation of steam traps. No matter how well made or designed they may be, successful operation depends on the two general principles, equalization of pressure and gravity flow being carefully considered in making steam trap installations.

JUDICIAL DECISIONS.

GUARANTEE TIRE & RUBBER CO. V. VEHICLE APRON & HOOD CO. This was an appeal from the Superior Court of Marion County, which judged for the plaintiff.

Defendant objected to the instructions of the court to the jury concerning the question of the authority of plaintiff's agent to make an agreement for the return of goods, claiming that these instructions did not tell the jury that plaintiff should have accepted or repudiated the contract as a whole.

It was found that the case had been given a fair trial on proper instructions and judgment of the trial court was affirmed. [Northeastern Reporter, Vol. 115, page 89.]

MARKS RECLAIMING PATENT DECISION.

In our issue of April 1 we stated that the Circuit Court of Appeals for the sixth circuit, by affirming the decision of the District Court, had created a situation which left the question of the validity and infringement of the Marks Reclaiming Patent still undetermined. An examination of the decision shows that that is not the case, as the Circuit Court of Appeals in Ohio based its decision solely on the question of infringement. The following is quoted from the opinion: "In the view we take of the claim allowed and the question of infringement, it is not necessary to pass on the validity of the patent."

As to infringement, the Ohio Court had before it a different question from that before the New York Court. In Ohio, the

defendant was first destroying the fabric in the rubber with acid and then treating the rubber for about seven hours with caustic soda. The Court held that this process did not infringe the Marks claim for a treatment of "twenty hours more or less" with caustic soda. The Ohio decision in no way affects the earlier decision of the Court sitting in New York.

UNITED STATES CUSTOMS DECISION.

The United States Court of Customs Appeals, May 14, rendered the following decision relating to syringes and other articles in chief value of hard rubber, in the case of Knauth, Nachod & Kuhne v. United States. These goods were assessed at 25 per cent as manufactures of hard rubber. The importers protested that they were properly dutiable at 15 per cent as druggists' sundries, but the Board of General Appraisers overruled the protest and their decision was affirmed by the Court.

"HORSESHOE," ADMITTED TO REGISTRY.

In THE INDIA RUBBER WORLD, April 1, 1917, a brief reference was made to the trade-mark "Horseshoe." In order to prevent any misunderstanding, the complete decision follows:

Ex parte, Racine Auto Tire Co. Application for registration of trade-mark for tires, outer casings and inner tubes, filed March 31, 1915, No. 85,589. Appeal.

The applicant appeals from the ruling of the examiner of trade-marks in refusing registry of the word "HORSESHOE" as a mark for inner tubes for tires, and tires and tire casings of rubber or rubber and fabric, on the ground that the term is merely descriptive of the goods.

If it be supposed that the word is merely descriptive of the outer tires because the tread of the tires may have projections in the form of minute horseshoe figures (of which I find no evidence in the file), I think nevertheless this is not merely descriptive, since no mechanical function or peculiarity of construction in a mechanical sense arises out of the raised studs being U-shape rather than T-shape or O-shape. Any projection having parts running in variant direction would be functionally the same; the particular shape is a mere matter of suggestive appearance. Would a 4-11-44 mark be descriptive because repeated over and over around the tread?

The case is distinguishable from that in *re* United States Tire Co. 225 O. G., 1107, because a chain tire is a tire having a chain-like series of projections, that is, projections with elements both longitudinal and lateral, by which the mechanical function of preventing slipping in either direction is attained. The chain tire was in wide use and patented as such, and the word described a useful unclaimed construction which anybody had the right to describe by that term. But if one thereafter should put a chain of figures of a duck on the tire and call it the "Duck" tire, this would not describe the tire, but the particular design of the projections thereon, used in that form, not for mechanical purposes, but for ornament and identification.

A more serious question raised is whether the applicant is barred by the fact that the expired Ives patent, No. 541,091 of June 18, 1895, shows incidentally a series of projections in the form of horseshoes on the tire in one of the figures. I do not, however, feel justified in assuming, because Ives published a picture which showed conventionally some projections of diamonds, horseshoes, etc., that therefore if one made a tire accordingly it would of course be described as a diamond tire or a horseshoe tire.

Certainly, as to inner tubes, on which of course the applicant would never put horseshoe projections, the trade-mark cannot be refused registry. The horseshoe has a prominent significance as the sign of good luck; it is fanciful, and a good identifying mark. It appears of record that no other tires known by this name have ever been made or known, though the applicant inquired of Ives and the owner of his patent. The mark will therefore be passed for registry, and the examiner's rejection is overruled.

F. W. H. CLAY,

Assistant Commissioner
United States Patent Office.

October 30, 1916.

Orders for submarine batteries have been placed by the government of the United States with several rubber mills. This is said to be seriously affecting the supply for battery dealers. These batteries are very large, and battery equipments for submarines are said to cost \$50,000 apiece.

What the Rubber Chemists Are Doing.

NATURAL COAGULATION OF THE LATEX OF *HEVEA BRASILIENSIS*.

THE phenomena of natural coagulation of the latex of *Hevea Brasiliensis* is under investigation by L. E. Campbell, who presents a preliminary account of his research in the "Journal of the Society of Chemical Industry" (March 15, 1917), condensed as follows:

Reference is made to the hypothesis of Whitby that four agencies are responsible for the changes that take place in the latex of cultivated *Hevea Brasiliensis*, namely a coagulating enzyme, an oxidase, anaerobic putrefaction, and aerobic putrefaction. The present paper concerns only the coagulating enzyme, the nature of which has been determined to some extent. The natural coagulation of latex bears a superficial resemblance to the clotting of blood. It is known that blood contains a coagulating enzyme and that lime salts (calcium chloride) exert a particularly favorable influence on the rapidity with which the clotting of blood takes place. On the other hand, if blood be collected in a solution of alkali oxalate it does not clot, owing to the precipitation of the calcium oxalate. Again, the presence of calcium salts plays some part in the coagulation of milk by rennin.

Coagulating enzymes are known to occur in certain plants, and some of these are known to require the presence of calcium salts for their action.

Two sets of experiments were carried out, one on the influence of the addition of calcium chloride and the other on the influence of the addition of precipitants of calcium.

Latex, when rendered alkaline with the hydroxides of sodium, potassium or barium, did not coagulate at all. It is, therefore, probable that the coagulating enzyme of *Hevea* latex requires an acid medium for its action.

The author states in conclusion as follows:

The natural clotting of *Hevea* latex is aided by the addition of calcium chloride.

So far, salts of other metals have not been found to produce an equal effect. This natural clotting is retarded or inhibited by (1) heating; (2) addition of neutral or faintly acid solutions of precipitants of calcium, namely, potassium oxalate and sodium fluoride; (3) rendering the latex alkaline in reaction; (4) formalin.

In the case of formalin, the phenomena are somewhat complicated by the fact that by the prolonged action of formalin on latex, a peculiar condition of the latex is produced. It retains its superficial appearance but is in reality a suspension of flakes of coagulated rubber in a clear serum, the Brownian movement of the particles having ceased. The factors concerned in the "natural" coagulation of latex are, like those concerned in the coagulation of blood, somewhat complex. In the latter case it is not yet clear how the coagulation is effected.

In view of the uncertainty as to the mechanism of the coagulation of blood it is not proposed to offer explanations as to the mechanism of the coagulation of latex. From the evidence obtained, however, it is fair to assume that:

- (1) The natural coagulation of latex depends upon the action of an enzyme.
- (2) The action of this enzyme is encouraged by the presence of calcium ions.
- (3) The enzyme does not act in an alkaline medium.
- (4) According to Whitby the coagulation can take place in the absence of air.

It has frequently been stated by various investigators that latex as it emerges from the latex vessels is alkaline in reaction, afterwards becoming acid on exposure to air. It is possible that the coagulating enzyme is enabled to act only on the development of this acidity.

In the experiments the addition of a given amount of calcium chloride to a given amount of latex on one day did not produce the same effect as an equal amount of calcium chloride on the same amount of latex on another day. The same applies also to the action of potassium oxalate and of sodium fluoride.

This difference is probably due not to the fact that the latices on the two days contained different amounts of enzymes, but rather to the fact that the latices had been examined at different times after collection. The action of the enzyme had already proceeded to a greater extent in one case than in the other.

It is to be noted that the latex contains a carbohydrate, *l*-methylinosite.

Many enzymes appear to be combinations of protein and carbohydrate, and it is possible that *l*-methylinosite may prove to be part of the enzyme of *Hevea* latex.

Serum from pure latex contains up to four per cent of solid matter.

The author is continuing his investigations on coagulation.

THE NATURAL ACCELERATION OF PARA RUBBER.

Dr. Henry P. Stevens has investigated the natural accelerator of Para rubber for the Rubber Growers' Association and presents an extended account of his work in the "Journal of the Society of Chemical Industry" (April 16, 1917), of which the following is a condensation:

In various papers Dr. Stevens has shown that certain constituents normally present in raw rubber are necessary for its satisfactory vulcanization. These constituents are (1) the nitrogenous complex or "insoluble" constituent which is almost wholly insoluble in benzene, chloroform, and similar solvents; (2) matters which can be extracted with acetone—mainly resins. Also the insoluble constituent can be replaced by other nitrogenous matter, such as peptone, to a lesser extent by casein, and to a slight extent by non-nitrogenous substances, such as starch. The acetone-soluble constituents (mostly natural resinous matter) have not been satisfactorily replaced by other resins, such as colophony. From this it may be inferred that the active constituent contained in the acetone extract consists of matter other than resin, although the latter bulks largely. The removal of the nitrogenous matter has the effect of retarding vulcanization, but does not affect the stability of the caoutchouc or the vulcanized rubber. The removal of the acetone-soluble matters not only tends to retard vulcanization, particularly when the rubber is compounded with litharge, but also reduces the stability of the caoutchouc and renders it more readily oxidizable. Numerous analyses failed to reveal any direct relationship between the percentage of nitrogen and the vulcanizing properties of raw rubber.

Dr. Stevens confirms Eaton and Grantham's observations that a more rapidly vulcanizing crêpe rubber is produced by allowing wet coagulated latex to stand for a few days before washing and drying; but he does not find any marked change in the percentage of nitrogen, either in air-dried or smoke-dried rubber from the same latex when subjected to the same detail of preparation and lapse of time before vulcanization.

Peptone, in its power to promote vulcanization, is roughly equivalent to the natural protein matter, and consequently the addition of peptone to a rubber already containing sufficient nitrogenous matter for complete vulcanization will have a very slight effect. Eaton and Grantham have shown that heat-coagulable proteins, which separate on concentration of latex serum have, when added to ordinary crêpe rubber, no influence on the rate of vulcanization. The natural insoluble nitrogenous matter, peptone and other complex proteins, must be sharply dif-

ferentiated from the simpler amino compounds produced by their putrefaction or from the synthetical accelerators. These simpler bodies are far more effective in promoting vulcanization. Hence they accelerate vulcanization in a rubber such as ordinary washed crêpe already containing sufficient protein matter for normal vulcanization. A complex substance, such as peptone, is not so active and consequently does not produce appreciable acceleration. We require to distinguish clearly between the complex nitrogenous substance (protein) which is necessary for normal vulcanization but which can hardly be termed an accelerator, and simpler nitrogenous derivatives which are more effective than proteins and are true accelerators. The latter are able to produce appreciable acceleration in an ordinary raw rubber, while the former cannot. To gage the effect of the former substances as catalysts or promoters of vulcanization, it is necessary to start with a rubber from which the natural insoluble nitrogenous constituent has been removed. A series of experiments has now been made with rubber from which practically the whole of the nitrogenous material has been removed by standing for a period of one to two years in the dark with cold benzene. The clear supernatant solution of rubber was then poured off and the rubber recovered from this by spontaneous evaporation without artificial heat. The original raw material was an unsmoked sheet rubber containing 0.48 per cent of nitrogen. After removal of the insoluble matter the "protein-free" rubber contained only 0.07 per cent of nitrogen. Separation of the insoluble matter was very complete, and it is possible that this small residue of nitrogen was present in some soluble form.

The following "mixes" were made up, on the simple formula of rubber 100 parts, sulphur 10 parts.

1. Untreated sheet.
2. "Protein free" sheet.
3. "Protein free" rubber plus three per cent of the heat coagulable proteins which separated out as a flocculent precipitate on concentrating the serum expressed in sheet making.
4. "Protein free" rubber plus one and one-half per cent of the evaporated liquors after removal of the flocculent precipitate referred to above.
5. "Protein free" rubber plus three per cent of *l*-methyl-inositol extracted from the residual liquors. This represents about the maximum amount of this crystalline substance ordinarily found in sheet rubber.
6. Rubber rich in protein, being the residue of rubber and solvent after pouring off the clear benzene solution.

The following results were obtained, all samples being cured under the same conditions (three hours at 135 degrees C.) so as to illustrate the effect of the different constituents:

	1.	2.	3.	4.	5.	6.
Breaking load, grams per square millimetre	1,360	590	700	940	1,280	810
Final length (original length = 100)	1,010	1,160	1,040	860	1,110	630
Tensile product	136	68	73	81	32	51
Coefficient of vulcanization	3.66	1.60	3.08	5.28	1.32	6.44
Nitrogen calculated on raw rubber, per cent	0.48	0.05	0.57	0.35	0.05	1.81

In experiments of this type particular attention should be paid to the figures for the coefficient of vulcanization. Tensile figures are more difficult of interpretation, as a low breaking load may be caused not only by under or over-vulcanization, but by the adulteration of the rubber itself.

The results clearly show the effect of the different nitrogenous constituents on the vulcanizing properties of the rubber.

(2) Shows that the removal of the insoluble nitrogenous matter causes a greatly reduced rate of cure. The breaking load has fallen to less than one-half. The elongation is greater and the coefficient of vulcanization is much lower.

(3) Shows that the addition of the insoluble matter which separates from the mother liquor or serum on evaporation causes an increased rate of vulcanization. This insoluble matter behaves

like the natural protein matter retained in ordinary crêpe rubber. The coefficient of vulcanization is almost equal to that of the original untreated rubber. Although the effect of adding the insoluble matter to sample (2) is so marked, it is quite possible that the effect of adding it to sample (1) would have been inappreciable.

(4) The effect of the addition of soluble nitrogenous matter is similar to that of the insoluble nitrogenous matter in sample (3), but is much more pronounced. The coefficient of vulcanization much exceeds that of the original rubber, sample (1). The efficiency of this soluble matter is no doubt due to its containing protein decomposition products. In the main it will consist of *l*-methylinositol.

(5) Shows that the effect of the addition of the methylinositol is to retard vulcanization.

(6) This sample contains a large excess of the insoluble nitrogenous matter (protein) naturally present in rubber. Its effect has been to increase the rate of cure. Both samples (4) and (6) are much over-vulcanized. The percentage of nitrogen in sample (6) is 1.81, in sample (4) it is only 0.35. Yet the effect of the larger proportion of nitrogenous matter on the coefficient of vulcanization and physical properties in sample (6) has not been very much greater than that of the small proportion of soluble nitrogenous matter in sample (4). This clearly illustrates the difference between the action of the insoluble and soluble nitrogenous matters.

The conclusions to be drawn from these results are that complex nitrogenous matter (protein) promotes vulcanization, and that naturally present in the rubber is necessary to secure vulcanization within reasonable limits of time and temperature. There are, however, simpler nitrogenous substances, probably formed by the decomposition or gradual breaking up of the complex proteins by the action of micro-organisms which are far more active as vulcanizing agents than the proteins themselves.

Some measure of the efficiency of the organic bases produced during putrefaction of latex serum was worked out experimentally, resulting in this conclusion, namely: The organic bases separated and used in these experiments are not volatile or not readily volatile. The putrefaction of latex serum might well give rise to volatile bases and such are indeed formed. Their presence can be shown by cutting up matured slab into small pieces and distilling in steam.

In general the experimental results show that the rapid curing property of matured coagulum is due to organic nitrogenous bases formed during putrefaction, as small quantities of these bases can be extracted from the rapidly curing rubber which has undergone putrefaction, while only a trace can be extracted from the ordinary pale crêpe. Further, that similar bases can be extracted from the residual liquors and very small quantities of these bases have been shown to have very marked effect in promoting vulcanization.

COAGULATION OF LATEX IN PRESENCE OF SUGARS.

The work of Gorter and Swart on the coagulation of latex in the presence of sugars is presented in Bulletin No. 6 of the West Java Rubber Testing Station and given here as condensed by "Chemical Abstracts."

Gorter and Swart confirm the observations of Eaton and Grantham that coagulation results from the action of micro-organisms and is favored by the presence of sugars. They also further find that the sugar undergoes a complicated fermentation, producing lactic acid (mainly) with some acetic and succinic acids. The resultant acidity is the real cause of the coagulation. The amount of acid formed is dependent on the amount of sugar present, but excess sugar inhibits fermentation and consequent acidity. Lactic acid plays an important part in the slow coagulation with acetic acid in minimum quantities. Latex contains 2.3 grams of sugar per liter, which is too little to help

the lactic fermentation in competition with other organisms; hence the addition of sugar is necessary. For large quantities, Gorter and Swart recommend 400-450 grams of sugar in 50 liters of water for each 175 liters of latex. The disadvantages of the process due to discoloration of the rubber, and the fact that only crêpe can be prepared, are discussed. It is pointed out that sugar is cheaper than acetic acid.

B. J. Eaton ["Agricultural Bulletin Federated Malay States," Vol. 5, 52 (1916), through "Chemical Abstracts"] has demonstrated that rubber prepared by coagulation in the presence of sugar is in every respect equal to acetic acid coagulated samples, and has a tendency to vulcanize faster. Crêpe of excellent color can be prepared by coagulation in the presence of sugar in a closed vessel, and subsequently soaking the coagulum for 24 hours in a five per cent solution of bisulphite of soda, as is done in the case of "lump" rubber or cup coagulation. The exclusion of the air during coagulation prevents any preliminary darkening due to oxidation.

COAGULATING AGENTS FOR SHEET RUBBER.

Coagulating agents for sheet rubber are discussed by Gorter and Swart in Bulletin No. 6, West Java Rubber Testing Station (through "Chemical Abstracts"). The work relates to the use of various acids and salts for coagulating and the possibility of their ultimate effect on the rubber. Hydrofluoric acid, sulphuric acid and alum are not recommended, especially in the manufacture of sheet, where a portion of the acid or salt is retained in the rubber. Experiments with the milk of young coconuts show a content of five per cent sugar and an acid content of only 0.4 per cent after seven days and of 0.46 per cent after 15 days. About half of the acid content was lactic acid, which probably inhibited the development of the acetic acid fermentation, and explains the low acetic acid content.

METHODS OF ANALYSIS.

DETERMINATION OF MINERAL MATTER IN VULCANIZED RUBBER.

J. P. PÉRÉGRIN in "Annales de Chimie Analytique" (February 15, 1917), refers to the inaccurate results obtained by direct incineration of rubber, due to losses of zinc, antimony and lead in the process, stating his method as follows:

One or two grams of finely rasped vulcanized rubber is heated with 50 to 100 grams of anisol for six hours at 100 degrees C. with frequent agitation until the rubber ceases to swell. Pure benzene is then added in large excess and after standing several days the mineral matters in the mixture are separated by centrifugal force.

The author prefers anisol to salol because the latter is too expensive. Cresol is not favored because it affords unsatisfactory results.

CELLULOSE IN RUBBER.

A method for the determination of cellulose in rubber by G. H. Hillen ["Gummi Zeitung," 670-1 (1916)] is given as follows, through "Chemical Abstracts" (May 10, 1917):

Regenerated rubber and rubber freed of fabric by the mechanical process may contain cellulosic residues. For their determination Hillen recommends treating 0.2 grams of the finely divided material with 30 cc. of Schweitzer's reagent, allowing the mixture to stand six to ten hours without stirring; filter through a gooch and wash with ammoniacal water until the wash water shows no color; acidify the united cellulose solution and wash waters with dilute sulphuric, filter the precipitated cellulose on a gooch, dry and weigh. The following points are of special importance: (1) The sample must be carefully selected and prepared by rasping with a file or similar means; (2) the Schweitzer reagent must be carefully prepared; (3) the beaker containing the sample and reagent must be well covered to avoid loss of ammonia; (4) the precipitated cellulose must not be left long in contact with the dilute acid, lest inversion occur; (5) since the voluminous cellulose easily clogs the filter, the moist precipitate

should be mixed before filtration with alcohol or acetone. The method is sufficiently accurate for technical purposes.

CHEMICAL PATENTS.

THE UNITED STATES.

PROCESS OF TREATING AUTOMOBILE TIRES AND INNER TUBES. Thickened neats' foot oil is applied to the inner wall of the tire shoe for impregnation of the shoe and surface coating the inner tube. [Frank S. Walton, Philadelphia, Pennsylvania. United States patent No. 1,223,302.]

RUBBER SUBSTITUTE. A composition of matter for use in the manufacture of vehicle tires and like purposes, including Para rubber, 8 parts; Kieselguhr, 2 parts; fuller's earth, 2 parts; asbestos, 3 parts; oxide of lead, 5 parts; sulphur, 1 part; aluminum wool, 2 parts; cotton, 2 parts, and wood pulp, 4 parts. [Francis A. Halsey, Philadelphia, Pennsylvania, assignor of one-fourth to Charles Hamilton, Philadelphia, Pennsylvania. United States patent No. 1,223,692.]

THE UNITED KINGDOM.

PACKING. A composition of about equal parts of rubber and mineral oxides, such as zinc oxide or silica, is used as a packing for steam, air or hot water. [E. T. Williams, 11 The Drive, Golder's Green, London. British patent No. 103,776 (1917).]

RECLAIMED RUBBER. A plastic mass made by heating such salts as aluminum, calcium or magnesium stearate, or iron, calcium or magnesium palmitate with an oxidizing oil. In an example, 1 part of aluminum stearate, dissolved in the same or a smaller quantity of ozokerite or the like, is mixed with 4 to 10 parts of oxidized linseed oil at 200 to 250 degrees C. The product may be vulcanized, with addition of rubber, asphalt, magnesia, Kieselguhr, chalk, red lead, etc. [E. S. Ali-Cohen, 43 Stadhoudersplein, The Hague. British patent No. 103,824 (1917).]

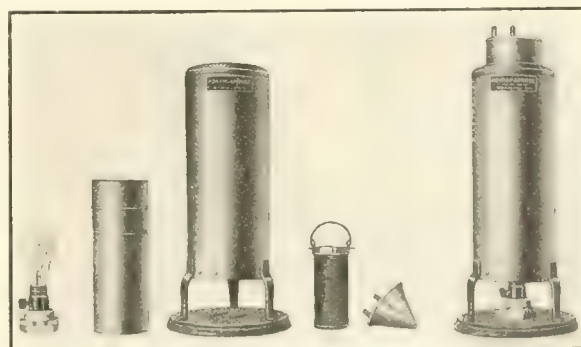
THE FRENCH REPUBLIC.

COAGULATION. Process and apparatus to determine the volume of acid needed to coagulate a given volume of rubber latex. [T. Cockerill. French patent No. 482,020.]

LABORATORY APPARATUS.

RUBBER EXTRACTOR.

A PIECE of apparatus known as the New York Testing Laboratory Extractor, while originally designed for the extraction of asphaltic materials, is a valuable acquisition to the rubber laboratory, particularly for the chemist whose work requires the



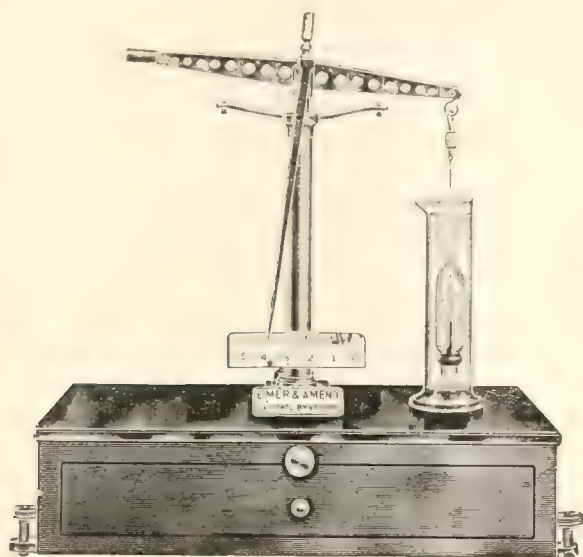
THE VARIOUS PARTS AND THE ASSEMBLED EXTRACTOR.

extraction of large samples of rubber with volatile and inflammable organic solvents. It can be used with any solvent commonly used in rubber analysis. The extractor combines safety, capacity, efficiency, durability and economy of solvent. It is made entirely of metal and is electrically heated, and was designed by Charles P. Fox. [Howard & Morse, 1197 DeKalb avenue, Brooklyn, New York.]

YOUNG'S GRAVITOMETER FOR LIQUIDS.

Young's Gravimeter for liquids is a new instrument designed for accurate and rapid determination of the specific gravities of liquids. The regular range of the instrument is 0.600 to 2.000. From 0.600 to 0.700 no weight is required, but a different weight is furnished for each 0.100 of gravity. For the range 0.600 to 2.000 there are required 14 weights. The second and third decimal places are shown on the scale.

In making a determination the plummet is immersed in the



liquid to be tested. If the pointer swings between 0 and 100 on the scale, the specific gravity is 0.600 plus the reading of the pointer on the scale. If the pointer swings beyond the 100 mark, it is necessary to place on the hanger of the plummet the one weight which will bring the pointer between 0 and 100. This weight gives the first decimal place, and the remaining two places are read at once from the position of the pointer on the scale. Higher ranges and special weights are provided for specific quantities above 2. [Eimer & Amend, 211 Third avenue, New York City.]

RUBBER HOSE FOR USE ON AIRPLANES.

A PAPER on the construction and tests of gasoline and other hose for use on airplanes may be found in "The Journal of Industrial and Engineering Chemistry" (April, 1917), by Percy A. Houseman, formerly chief examiner, Aeronautical Inspection Department Laboratories, London, England. Previous to initiating a system of inspection in England the quality of rubber used for gasoline on airplanes was quite unsatisfactory. The following specifications and tests for gasoline hose were found suitable for controlling the quality.

FLEXIBILITY. The hose is bent to a circle having a diameter D which varies according to the inside diameter of the hose d as follows: Up to one-half inch, $8d$; nine-sixteenths to one inch, $10d$; one and one-sixteenth to one and one-half inch, $12d$; over one and one-half inch, $14d$. The diameter of the tube so bent should not change at any point by more than ten per cent from its original diameter.

IMMERSION IN GASOLINE. A three-inch sample of the hose is boiled in gasoline for one hour under a reflux condenser, followed by 24 hours' standing in gasoline at room temperature. The approximate increase in weight and volume of the sample is recorded. The decrease in bore at narrowest part should not exceed 25 per cent.

The adhesion of rubber to canvas must remain good, and the "nerve" of the rubber must not be seriously impaired when examined immediately after the gasoline treatment.

PERMEABILITY TO GASOLINE. A sample of the hose 14 inches long is held vertically and plugged with a glass stopper at the bottom. A glass tube is fitted in the top, and is filled with gasoline to a head of 12 inches above the top of the hose sample. The length of the hose exposed to the action of the gasoline is 12 inches. The level of the gasoline in the glass tube should not be allowed to fall more than three inches, additions of gasoline from a known volume being made as necessary. The amount of gasoline which permeates through the walls of the hose is noted during the first and second days, as a guide to the behavior of the sample. During the third 24 hours, by which time the rate of permeation has become approximately constant, the gasoline passing through the walls should not exceed 100 cc. per square foot of original internal surface.

DRY HEAT. A piece of the tube is heated for two hours at 132 degrees C. The rubber should remain elastic and show no signs of stickiness or brittleness, nor should any surface cracks show on stretching the sample.

ACETONE EXTRACT. Free sulphur, mineral sulphides and sulphur of vulcanization are determined. The free sulphur should not exceed one per cent.

ASH. The amount and composition of the ash are determined.

QUALITY OF CANVAS. This is left to the judgment of the manufacturer.

Rubber hose for use with gasoline on French airplanes is required to contain 45 per cent mineral matter with a margin of 5 per cent; 50 per cent rubber with the same margin, and to have a density of 1.6 (0.1).

The preferred construction of gasoline hose consists in preparing the fabric with a layer of rubber on one side double the thickness of the fabric, so that in cross section of the finished hose the fabric is embedded as a spiral in the rubber. Such a hose shows improved flexibility, better behavior under the immersion test and less tendency to separation between rubber and fabric, and a smaller constriction of the bore. Two plies of fabric are used in five-eighths-inch hose; three plies between five-eighths and one and one-quarter-inch hose, and four plies for larger sizes. The larger sizes are used for oil and water.

TURPENTINE AND ROSIN IN RUBBER MANUFACTURE.

ALTHOUGH classed as "naval stores," turpentine and rosin are used to-day for a wide variety of purposes having nothing whatever to do with shipping. A list recently prepared by the Bureau of Chemistry, U. S. Department of Agriculture, gives 44 industrial uses of turpentine, 67 uses of rosin, 20 uses of rosin oil and rosin oil products, and 13 uses of pitch. Those applicable to rubber manufacture follow:

TURPENTINE

Solvent for gums in varnishes.
Ingredient of waterproof cements for leather, rubber, glass, metals, etc.

Solvent for waterproofing compositions.
Raw material for producing isoprene used in making synthetic rubber.

In rubber substitutes.
Solvent for rubber, caoutchouc and similar substances.

ROSIN.

Rubber substitutes.
Adulteration of ceresin and paraffin waxes.
Adulteration of shellac and certain resins.
In waterproofing compositions for paper, cardboard and fabrics.
In the manufacture of condensation products.

ROSIN OIL AND ROSIN OIL PRODUCTS.

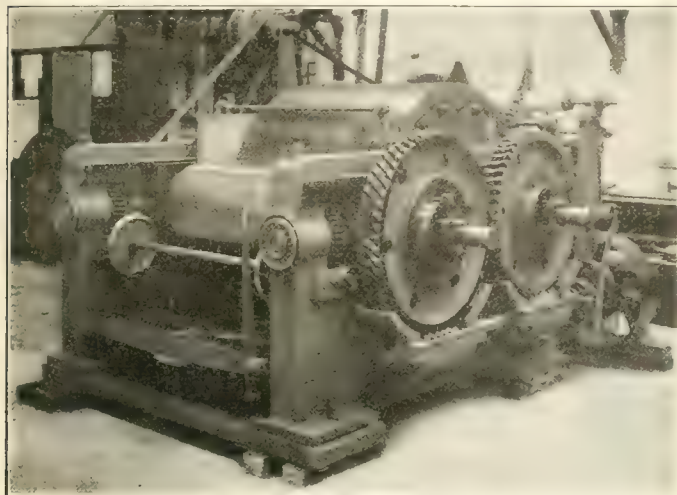
Rubber substitutes.
RUBBER COMPOUNDING.
To which might be added the use of rosin oil, pitch and rosin in frictions, tapes, etc.

Of value for daily reference in every rubber office—"The Polyglot Rubber Trade Directory, 1916."

New Machines and Appliances.

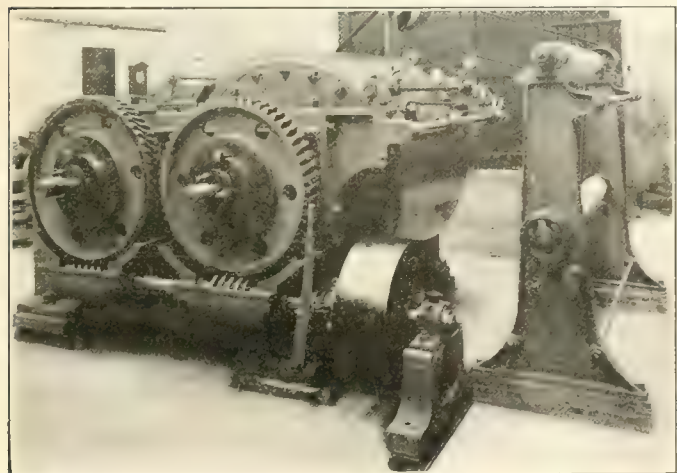
MACHINE FOR MAKING ASBESTOS SHEET PACKING.

THAT the manufacture of Klingerit packing has progressed in England since the war is shown by the following illustrations of a novel machine specially designed for making high pressure packing. The mechanical operation is in general the same as the German mill, illustrated and described in the article on the manufacture of Klingerit steam packing that ap-



peared in *THE INDIA RUBBER WORLD*, March 1, 1917. There are, however, special features in this new machine that are of sufficient interest to warrant a brief description.

A front and side view is shown in the first illustration, the small roll being adjusted to the large roll by worm and pinion gearing operated by two hand disks. Both rolls are chambered for heating and cooling purposes and are revolved by worm wheel and pinion gearing driven by belt power. The machine is started and stopped by independent levers, one being located



at the front and the other at the back of the machine, that control a friction clutch mounted on the pinion shaft.

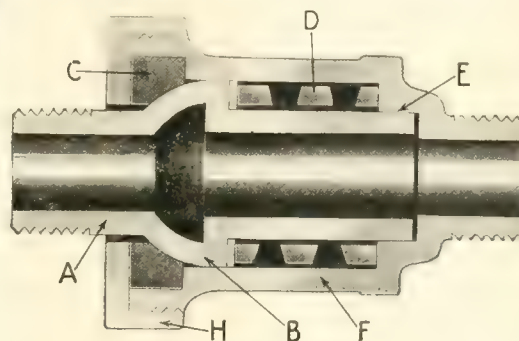
The prepared dough is fed to the rolls in sufficient quantity to build up a thin sheet on the large roll. A solution of rubber and balata is then applied and another sheet is built up on the first one in the same manner and solutioned. When the packing has been built up to the desired thickness, the machine is stopped and the sheet is cut transversely by the hand-operated cutting device attached to the side frames at the back of

the machine and shown in the second illustration. Just above the transverse cutting device are located the cutting rollers that trim the edges of the sheet.

The upper end of the cut sheet is then passed over the top roller of the winding frame, shown in the second illustration, and wound up on the lower or windup roller that is belt driven from the upper roller. This roller is driven from a counter-shaft that is attached to the opposite side of the machine and is driven from the front roll. The rolls are of chilled cast iron, the small roll measuring 18 by 41 inches and the large roll 51¼ by 41 inches. Compressed asbestos sheets in varying widths up to 40 inches and 161 inches long may be made on this machine. [Hampson Bros., Limited, Manchester, England.]

ROSTERN PACKLESS SWING JOINT.

The manufacturers of rubber goods are so well aware of the difficulties experienced with leakage in packed joints and hose connections that the following description of a new type of



flexible joint is of interest. Being made entirely of metal it resists high pressure steam, the action of volatile oils and the constant effort

of air to escape at the joints. Moreover, it is said to be unaffected by heat and cold, having been tested with steam at 350 degrees F., alternating with cold water at 64 degrees F. The construction will be readily understood by referring to the illustration in which *A* is a hollow cylinder having a ball-shaped shoulder *B* that revolves on an anti-friction metal bearing ring *C*, kept in close contact by a spring *D*, also by the pressure of steam or liquid passing through the joint. The cylinder *A* is kept in alinement by revolving in a socket *E*. *F* is the body and *H* its cap. These enclose all the other parts.

The spring *D* is made of a cast metal which is not affected by changes of temperature and is guaranteed to keep a constant pressure during the life of the joint.

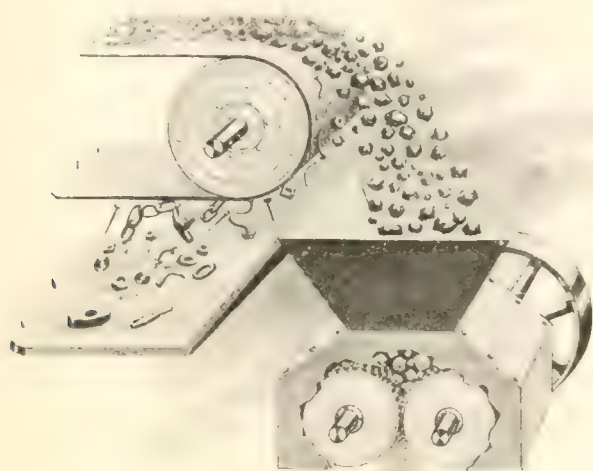
For vulcanizing presses, two styles are recommended, the Flexible and the Standard; two of the former and one of the latter are usually sufficient for a connection between two platens. These joints are used in connection with ordinary iron pipe on elbows and carry the guarantee of the manufacturer. [Rostern Co., Peoples Gas Building, Chicago, Illinois.]

DINGS MAGNETIC SEPARATOR.

The reclaiming of rubber scrap for reuse includes various processes among which that of metal separation by means of magnets is of importance. Such equipment is used to prevent damage to crushing and grinding machinery due to "tramp" iron frequently found in rubber scrap. Magnetic pulleys are recommended where large quantities of coarse material are to be handled and the iron to be extracted is limited in quantity.

In operation the material is fed upon a horizontally inclined belt conveyor passing over a magnetized pulley. The non-magnetic material falls by gravity from the brow of the pulley

into a suitable receptacle or to a conveyor leading to final delivery, while the iron and magnetic material is attracted and held firmly against the belt until it is carried to the point where



the belt leaves the pulley on the under side and is there discharged back of a partition set a few inches beneath the pulley in line with its axis.

The conveyor is usually a rubber belt of the best grade, heavy, and mechanically strong enough for the material to be handled. It should be made endless, so that no dust or fine material can work through at the splice. The belts are usually run at a speed of about 100 feet per minute and should be supported by rollers placed at suitable intervals. [Dings Magnetic Separator Co., Milwaukee, Wisconsin.]

A SANITARY WATER COOLER

Sanitary drinking fountains that supply pure cool water to the operatives are now considered necessary in the equipment of modern rubber mills. As a rule the fountains are placed at convenient points in the factory to which the cold water is piped from a central refrigerating station, a system that requires considerable outlay in equipment and piping while if the mill is a large one, pumping will be necessary.

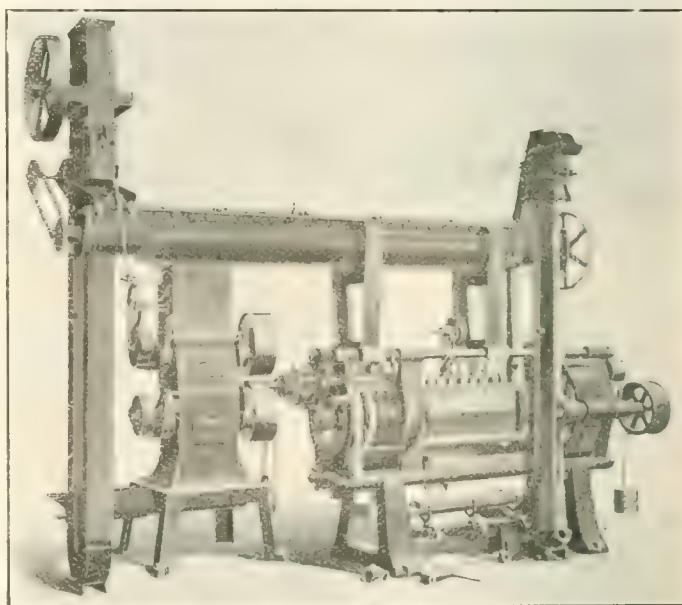


drinking device is of special construction and is controlled by a valve that closes automatically when the bubbler is not in use. The ice chamber is insulated and occupies the central part of the fountain. It is surrounded by the cooling coil through which the drinking water circulates. The ice chamber holds about 100

pounds of ice that under ordinary circumstances will last 1½ days. There is a waste pipe connection and an overflow connected to the bubbler. [Ebinger Sanitary Manufacturing Co., Columbus, Ohio.]

MACHINERY FOR EXPELLING OIL FROM HEVEA SEEDS.

It will not be many years hence when the 1,500,000 acres of *Hevea* planted in the Far East will produce enormous quantities of rubber seed that should be turned into useful products and at a profit to the estate owners. Experiments in the extraction of the oil contained in rubber seed have shown its practical utility in several ways, but particularly in the manufacture of soap. As a forward suggestion an illustrated description of a typical plant for this purpose follows: The illustration shows the front elevation of a complete one expeller oil plant that is continuous in operation. The seed is spouted into the roller mill and after being ground is elevated into the tempering apparatus. In passing the entire length of this apparatus it is slightly warmed and then drops into the hopper of the expeller. Here the pressing of the seed is performed in a perforated hardened steel cylinder, in which revolves a shaft, carrying a series



of hardened steel screws that produce a gradually increasing pressure that is regulated by a hardened steel cone. The oil is expelled through the perforations of the cylinder, drops in the oil strainer, and from thence into a pan. The foots accumulating in the strainer are fed automatically into the elevator which returns them into the feed hopper. The pressed cake is discharged at the opposite end of the cylinder. This makes an entirely automatic and continuous operation, from the moment the seed enters the mill until the oil is pumped into the filter press, and from thence into the barrel or storage tank, and the cake sacked or fed into the grinding mill.

All seeds may be pressed cold, and without grinding, but the best results are obtained by flattening and coarse grinding the seeds and then slightly warming the ground stock in the tempering apparatus, before introducing it into the expeller. By this method is obtained a maximum yield, without injuring the quality of the oil. Moreover, the oil from the machine can be at once pumped through the filter press and at the end of the day's run, or at any time during the run, the operator can tell exactly the yield of filtered oil that is being obtained from the material under treatment. No settling tanks are required when using this process, thus saving much valuable space.

The oil is practically cold pressed, the meal being warmed to

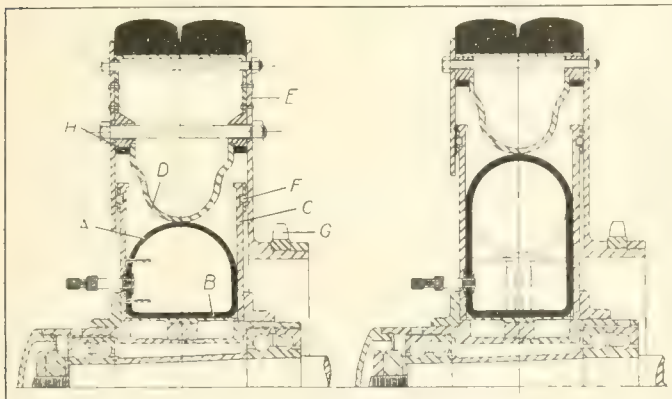
140 degrees F. in the tempering apparatus, which is not sufficient to harden the albumen, and consequently this remains in the cake. It is for this reason that the oil, containing no albumen, is of vastly superior quality. In the case of linseed oil it will not break, *i. e.*, it remains perfectly clear at a temperature of 800 degrees F., which makes it much more valuable for paint and varnish purposes than the old process oil. In the case of cottonseed oil and all other edible oils, it will make much sweeter oil, which refines more readily, and with smaller loss. As to the cake, the larger percentage of albumen makes it more valuable, inasmuch as the albumen is more easily digested in its raw state than when cooked. Cooked seed may be also pressed, obtaining the same yield as by the hydraulic process, and at a considerably lower cost. Less horse power is required for pressing cooked seed, and a larger quantity of seed can be pressed hourly, but while the products from the cooked seed are equal in quality to the best results obtained from the most improved hydraulic presses, they are not equal to the oil and cake obtained from the cold or tempered seed, as described above.

The plant working automatically effects almost a complete saving of labor. The machinery once started, one man can run a plant of at least six expellers, while by the hydraulic process four men are required to obtain the same results. It also eliminates the cost of expensive press cloths. [The V. D. Anderson Co., Cleveland, Ohio.]

PFYFFER'S RESILIENT WHEEL WITH PNEUMATIC HUB.

This is a resilient wheel that embodies the pneumatic principle without the wear and tear, punctures and blow-outs common to the average pneumatic tire. With slight variation in structure it is adaptable to heavy trucks, pleasure cars, bicycles and motorcycles.

Contrary to ordinary practice, the drive is transmitted directly to the rim section, thereby relieving the pneumatic part of the wheel from driving strains. The hub consists of two normally concentric main parts, one being revolvably secured to the axle, while the other is rigidly secured to the rim of the wheel. Interposed between these parts is a ring-shaped cushioning member, *A*, preferably a pneumatic tire, with a convex-shaped outer circumference. This modified pneumatic tire is mounted upon a cylindrical steel sleeve, *B*, which is secured to the axle, revolving around it in the usual way on ball or roller bearings, according



to the weight of the vehicle. The tire is held between two circular steel disks, *C*, which are secured to the sleeve, *B*, and support the tire on two sides, leaving the convex-shaped outer circumference free.

The principal feature of the invention comprises a ring-shaped steel casing, *D*, convex in cross-section, that encircles the tire and comes in contact with it, providing a narrow steel track upon which the tire rolls when revolving under

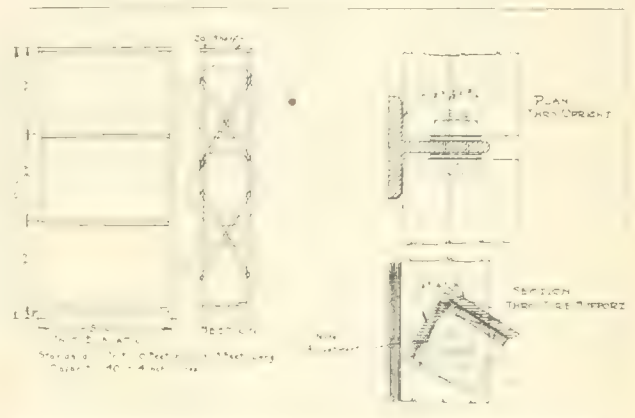
pressure. Thus the cushioning quality of the ordinary pneumatic tire is retained and punctures and blow-outs are eliminated.

Two circular-shaped steel plates, *E*, with an open center to allow play in a radial direction, are secured to the sides of the casing. Between the inner disks, *C*, and these outer disks, *E*, are anti-friction ball bearings, *F*, that take up the lateral forces while allowing radial play of the two concentric parts of the hub without friction between them. The wheel travels on a solid or block tire and is driven by chain drive, the sprocket wheel, *G*, being secured to the outer disk, *E*.

The illustrations show three variations of construction, the one on the left being the smallest type and the one on the right giving the greatest cushioning effect, while a circular-shaped tire occupying a place between these extremes is outlined in the same illustration. An additional factor of safety is provided by two ring-shaped cushions, *H*, of solid rubber that receive the weight on the wheel should the tire become deflated. [Paul de Pfyffer, 302 West Twenty-second street, New York City.]

CARLL STEEL TIRE RACKS.

When pneumatic tires have been finished, inspected and paper wrapped, they are sent to the storeroom, where they are segregated according to size and type. The racks on which they are placed are often built of wood and according to the individual ideas of the executive or superintendent. It is claimed that



wooden racks absorb moisture and dry out the tires to the detriment of the aging qualities of the stock in storage. However serious this may be, the substitution of all-metal tire racks for storage purposes has many advantages. For example, the system here shown permits the use of standard three-tier units, 5 feet long and 10 feet high, with a capacity of 40 4-inch tires. The angle iron supporting the tires is adjustable to accommodate tires of large and small diameter in such a manner that they rest on the flat surface of the angle irons. The construction is obviously strong, light and fireproof, while economy of factory space and the easy addition of units for storage extension are interesting features.

The first cost is said to be about equal to that of wood construction; moreover, the metal racks may be easily taken down and reassembled if so desired. A low insurance rate and minimum depreciation in value are the final advantages claimed by the manufacturers. [Chas. W. Carll's Sons, Trenton, New Jersey.]

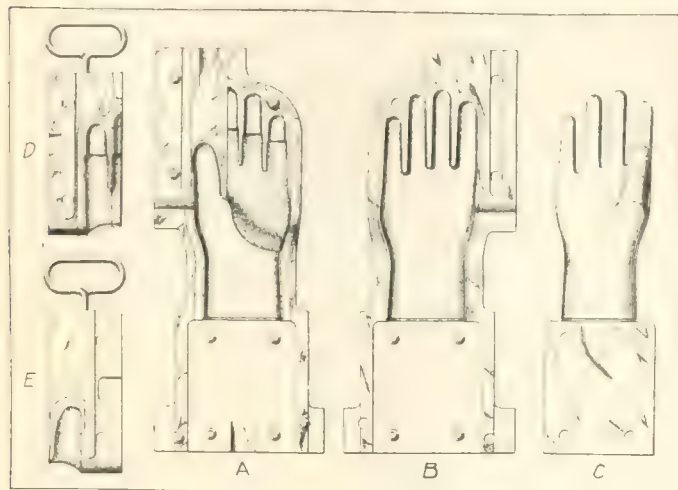
MACHINERY PATENTS.

MOLDING ELECTRICIANS' GLOVES.

THE entrapping of air and the formation of bubbles are difficulties that are incidental to making electricians' rubber gloves by the dipping process.

The present invention enables the production of a seamless, molded glove, the thumb being positioned opposite the forefinger with a space intervening, and one that is reinforced where strength and thickness are desired.

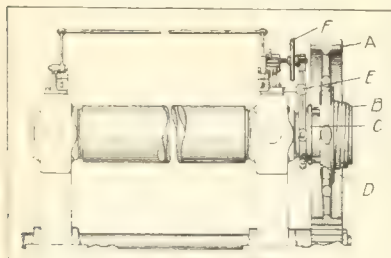
The mold, consisting of four parts, *A*, *B*, *C* and *D*, is shown in the illustration. *A* and *B* are the lower and upper mold



parts and *C* is the core. *D* is the part that occupies the space between the thumb and forefinger, the upper face forming the index and a portion of the middle finger, while the opposite face, shown at *E*, forms the balance of the thumb. Six pieces, destined to form the various parts of the glove, are cut from calendered stock and placed in their respective positions in the mold, which is then assembled and subjected to heat and pressure in a vulcanizing press. [Richard T. Griffith, assignor to The Miller Rubber Co.—both of Akron, Ohio. United States patent No. 1,225,028.]

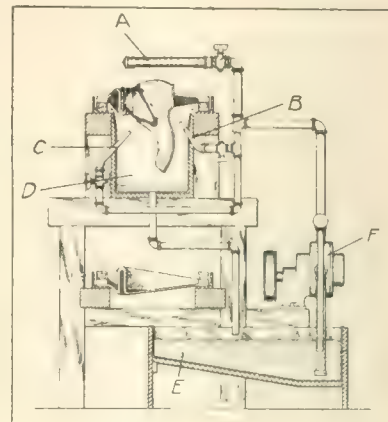
DRIVING CLUTCH FOR MILL ROLLS.

Usually the large driving gear of mills and grinders is attached to the back roll and driven from a clutch-controlled pinion keyed to the main driving shaft. According to the present invention the large gear shown in the illustration at *A*, rotates loosely on the roll. Keyed to the end of the roll is a clutch drum surrounded by a heavy spring coil *B*, that grips or releases the drum. The clutch actuating mechanism comprises a sliding collar *C*, provided with two oppositely placed arms carrying a guide pin and a clutch operating pin that is pivoted to the arms of a bell-crank lever attached to the hub of the large gear. A split ring *D* surrounds the collar and is connected by two arms to a rock shaft *E*. A vertical arm attached to the rock shaft supports at its upper end a threaded rod on which a combined nut and hand wheel *F* is mounted. When this is rotated in the proper direction the nut contacts with the vertical arm, thereby rocking the shaft, and the sliding collar operating the bell-crank connections tightens the coil clutch on the drum and connects the driver to the shaft. When the hand wheel is rotated in the opposite direction, the vertical lever is released, the collar slides back, aided by spring action, the coil frees itself from the drum and the machine stops. It is also equipped with a safety stop device whereby the machine may be instantly stopped by the operating rod that is arranged above the roll within reach of the operator. [David R. Bowen, assignor to Farrel Foundry & Machine Co.—both of Ansonia, Connecticut. United States patent No. 1,225,309.]



RUBBER SHOE VARNISHING MACHINE.

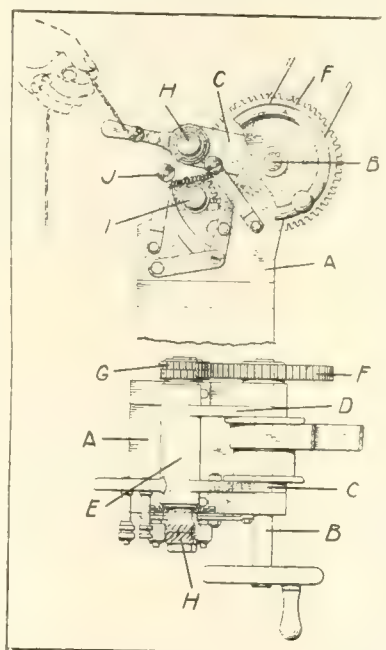
This machine comprises an endless chain conveyor that carries the lasted shoes past a series of nozzles from which shoe varnish is discharged, covering the shoes with a coat of varnish. The illustration is a transverse section of the machine at the point where the varnish is applied.



In operation the successive sticks of shoes are placed in the traveling holders and carried between the nozzles *A*, *B* and *C*, that direct a flow of varnish against the shoes as they pass in succession. The surplus varnish drains into the trough *D* and flows by gravity to the receiving tank *E*, from which it is continuously supplied to the discharge nozzles by the pump *F*. The machine is of sufficient length so that the surplus varnish will drip from the shoes into the trough. It may be so constructed that the sticks of varnished shoes can be taken from the machine and placed directly on the racks of the vulcanizing heater. [Le Baron C. Colt, assignor to National India Rubber Co.—both of Bristol, Rhode Island. United States patent No. 1,225,013.]

MACHINE FOR WINDING GOLF BALL CORES.

Elastic thread is wound in different great circles around the core, at the same time being evenly distributed over the entire body of the ball by the automatic action of the machine here shown. The upper illustration is a side elevation and the lower view is a plan of the machine.



The two side frames *A*, support the mainshaft *B*, that is provided with a hand wheel and belt drive. Pivoted on this shaft are two horizontal arms *C* and *D* that support the bearing *E*, through which pass a tubular and a solid shaft. Directly under the upper bearing is a similar bearing bolted to the frame and through which pass tubular and solid shafts similar to those in the upper bearing. The spur gear *F*, fixed to the main shaft, meshes with two sets of pinions of different pitch, being keyed to the upper tubular and solid shafts, respectively, while the other two pinions are keyed to the lower tubular and solid shafts. On the opposite ends of the upper shafts are two knurled disks *H*, and similar disks *I* are attached to the corresponding ends of the lower shafts. Due to the different pitch of the driving pinions the inside upper disk revolves at the same speed as the lower outside disk, and the upper outside disk revolves at the same speed as the lower inside disk, the former

pair rotating slightly faster than the latter pair. A ball retained between these disks will be rotated slowly about an axis which passes through the axes of the two shafts, then winding the elastic thread in different circles around the core.

The ball is held in position by rollers *J* and *K*, mounted on the ends of two pivoted arms provided with spring tension. For removing the ball, the upper bearing, being pivoted to the main shaft, is raised and lowered by the handle provided for that purpose. [Martin McDaid, Leith, Scotland, assignor by mesne assignments to Revere Rubber Co., a corporation of Rhode Island. United States patent No. 1,224,397.]

OTHER MACHINERY PATENTS.

THE UNITED STATES.

- 1,223,637. Automatically setting device for setting the core elements from which a laminated coarse material is constructed. L. A. Subers, East Cleveland, Ohio.
 1,223,726. Mold for solid tires. M. C. Overman, New York City.
 1,225,584. Tire vulcanizing mold. H. Cooney, Marion, Ind.
 1,225,593. Pneumatic tire building apparatus. P. and B. De Mattia—both of Clifton, N. J.

THE UNITED KINGDOM.

- 103,690. Hot rolling machine. G. Warwicke, 10 Clifton Road, Seven Kings, Essex, and A. P. Crouch, 106 Cannon street, London.
 103,819. Rubber vulcanizer. Marvel Accessories Manufacturing Co., 1220 West Sixth street, Cleveland, Ohio, U. S. A.
 104,210. Plantation washer for treating and extracting india rubber. A. A. Thornton, 8 Quality Court, Chancery Lane, London.
 104,323. Apparatus for coagulating india rubber. G. M. Thomas and M. D. Maude, Cicely Estate, Teluk Anson, Perak, Federated Malay States.
 17,911 (1915). Mechanically operated tire mold. J. H. and J. H. Coffey, 73 Jameson avenue, Toronto, Canada.

THE DOMINION OF CANADA.

- 174,533. Apparatus for cutting and reeling tire fabric. The Canadian Consolidated Rubber Co., Limited, Montreal, Quebec, assignee of D. Neil, Detroit, Michigan, U. S. A.
 174,549. Vulcanizer door. The Williams Foundry & Machine Co., assignee of H. L. Williams—both of Akron, Ohio, U. S. A.
 174,579. Apparatus for manipulating fabric rolls. E. B. Cederstrom, Detroit, Michigan, U. S. A.
 174,596. Pneumatic tire mold. J. Girard, Montreal, Quebec.
 174,646. Tire building machine. R. L. Taft, Hartford, Connecticut, U. S. A.
 174,532. Apparatus for exhausting the interiors of rubber articles. The Canadian Consolidated Rubber Co., Limited, Montreal, Quebec, assignee of C. J. Randall, Naugatuck, Connecticut, U. S. A.

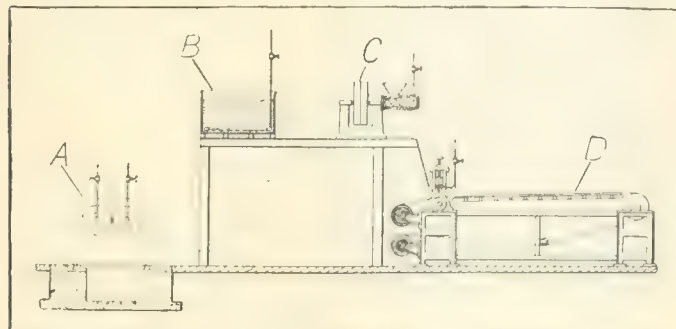
THE FRENCH REPUBLIC.

- 482,214 (March 17, 1916). Improvements in accumulator tanks. W. L. Walker.

PROCESS PATENTS.

PREPARING AND APPLYING ADHESIVE COATINGS WITHOUT SOLVENTS.

ACCORDING to this invention the fabric used for making "Gem" insoles is coated with adhesive without the use of solvents. Gutta percha, pontianak, balata or other gums that become plastic and adhesive when heated are mixed with wax on the mill *A*, shown in the illustration. The dough is then transferred to the tank *B*, containing water heated to a temperature of about 200 degrees F. From here the softened material is fed to the mixing and straining machine *C*, where it is tempered and



softened to the right consistency for spreading. The strained material is then directed to the spreading machine *D*, which applies

the coating to the fabric. The spreading knife is attached to a hollow support heated by steam that maintains the coating material in a plastic condition during the spreading operation. [James Meade, Stoughton, Massachusetts. United States patent No. 1,222,967.]

METHOD OF MAKING TIRE FABRIC.

TIRE building fabric is made by braiding the fabric upon a series of annular cores of the size and shape of the tire casing. The bands thus formed are cut circumferentially and used for building the casings of pneumatic tires.



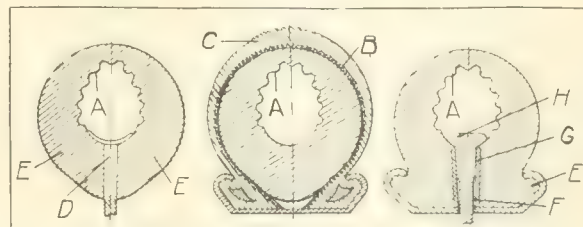
The illustration shows a series of collapsible cores placed one upon the other and around which the fabric is formed by any preferred form of braiding mechanism. The forms may be either moved upward or downward during the braiding operation. When they are moved upward those on which the fabric has been braided are removed from the top and others added at the bottom, thereby permitting a continuous operation of the machine. The yarn may be impregnated with or laid in rubber during the braiding process. [George F. Fisher, Plainfield, New Jersey, assignor to The Hartford Rubber Works, Hartford, Connecticut. United States patent No. 1,224,878.]

METHOD OF MAKING ELECTRICIANS' GLOVES. A glove with the thumb positioned opposite to the fingers and reinforced on the inside of the thumb, fingers and palm, is made in a mold from sheet stock and press cured. [Richard T. Griffiths, assignor to The Miller Rubber Co., both of Akron, Ohio. United States patent No. 1,225,027.]

MISCELLANEOUS PATENTS.

A FRENCH CUSHION TIRE.

IN this tire, the inner tube that is usually employed in ordinary pneumatic tires is replaced by a thick tube of flexible rubber, the central opening of which is ovoid shaped. The walls are



thinnest at the tread part and thicker at the base. A valve is provided that permits the air to escape or enter the tire automatically.

The improvements are as follows and consist in corrugating the walls of the tire, shown at *A*; in providing the exterior of the tire with fabric plies *B* to prevent wear when it is covered with a casing, as shown at *C*, and in securing the tire to the rim by bolts, *D*.

This tire may also be used directly on the rim without a casing. In this case it is provided with beads *E* that fit into corresponding channels in the rim. The tire may be divided along its annular circumference as at *F*, and provided with expansible sleeves *G* and tapering bolts *H*, the action of which expands the beads and holds the tire firmly in place on the rim. [A. Broussois. French patent No. 481,850.]

New Goods and Specialties.

JAPANESE RUBBER TOY

A REMARKABLY realistic conception is this modest little toy from Japan. Nestling between leaves of green paper is a small bud or blossom made entirely of rubber, in yellow, tipped with red, the whole being securely fastened to a



bamboo stem. Blowing into this stem at its opposite end causes the blossom to gradually expand until it becomes a life-like representation of a luscious, full-grown apple.

COMBINATION BALL.

With this new toy for children many tricks may be performed. Its construction is exceedingly simple. A small white rubber ball with a ribbed surface is threaded with a long string of red rubber upon which it slides and whirls at the pleasure of the owner. [Robert J. Mulvey, Chicago, Illinois.]



PNEUMATIC HORSE COLLAR.

Padding is essential in a horse collar for protection, but it adds considerably to the weight of the collar and consequent burdening of the animal. A solution of the problem is offered in the form of a horse collar embodying a pneumatic pad built up similar to an automobile tire. Each side of the collar is a chamber of suitable shape to receive an inner air tube, which is blown up with a tire pump; and it is claimed that this collar is not only extraordinarily light in weight but fits better than most on the neck of the horse.

NO-GLARE AUTO SHADE WITH RUBBER WASHERS.

A convenient protection against motoring accidents caused by reflecting sun or strong headlights is afforded in the accessory



shown herewith. It takes the form of a blind, or window shade, with a transparent section, fastened to a spring roller and operating like an ordinary spring blind. A heavy rod along the bottom serves to maintain the curtain in position, and rubber rings at the ends of the rod and the spring roller keep these parts from injuring the glass in the wind-shield. The vision opening is of transparent pyralin, measuring 8 by 8 inches, the entire shade being over 12 inches long and enclosed in a nickel-plated or black enamel cylinder. [No-Glare Auto Shade Co., 3301 North Main street, Los Angeles, California.]

HOME HELPS DISH WASHER.

A device to facilitate the inevitable duty of dish washing and obviate its disagreeable features is shown herewith. One end of a rubber hose, specially compounded for hot water conduction



and measuring two feet in length and one-quarter inch in diameter, is attached to the hot water faucet by a special connector with a rubber gasket which insures a perfectly tight fit. At the other end of the hose is a scouring brush with a rubber ring around its edge which serves as a buffer and protects the china. Between this brush and the hose is an ingenious spraying arrangement by means of which hot soapsuds or clear hot rins-

ing water flows upon the soiled dishes, the user simply holding the device by its handle and manipulating a button. A wire drying basket is also furnished with the outfit and no dish pan nor towels are required in the operation. [Home Helps Manufacturing Corp., 39 West Thirty-eighth street, New York City.]



BATHING COSTUME NOVELTY.

The latest accessory to the feminine bathing costume now being shown in department stores is the water-proof bag for carrying the bathhouse key and valuables. This attractive and convenient novelty is made of rubberized material, with a rustproof clasp which fastens securely, and is attached to the wearer by a belt strap.

INFANT'S DRESSING TABLE WITH RUBBER-TIRED WHEELS.

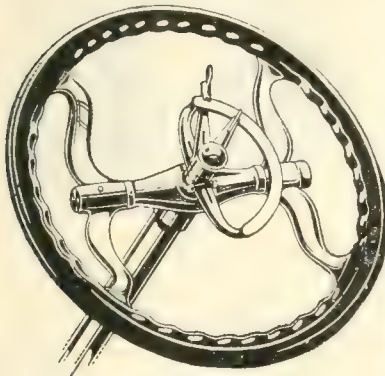
To hold a lively infant in the lap during the operation of clothing its kicking, wriggling limbs presents difficulties possibly unrealized by the lay mind, but well known to mothers and nurses through difficult experience. A mechanical aid which should find ready sale as an accessory to the nursery furnishings is the portable dressing table shown herewith. Solid rubber-tired wheels allow it to be moved about easily and noiselessly. The substantial steel frame, finished with baked white enamel, rigidly locks when in use but folds and stands alone when not required, occupying very little space. The 32- by 19-inch top is made of a special kind of leatherette which can be easily washed, thus affording the perfect sanitation so essential to the baby's welfare. [The Kolb Specialty Co., 4909 N. Eleventh street, Philadelphia, Pennsylvania.]



WARMED, TILTING STEERING WHEEL.

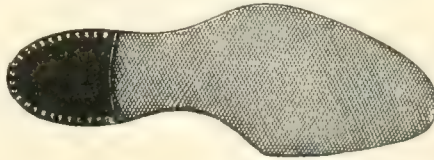
A steering wheel that warms the hands of the driver in the bitterest weather is a valuable addition to any car. The wheel shown herewith contains heating units cast within the molded rim, which is made of Condensite, and the heating current required is claimed to be less than that used for a headlight. A press button switch turns the current on and off. The wheel, which is 18 inches in diameter, tilts on heavy trunnions and locks firmly in driving position, giving all the security of a solid wheel.

The Condensite rim has a corrugated edge and is molded on the aluminum spider. [Pouvailsmith Corp., Poughkeepsie, New York.]



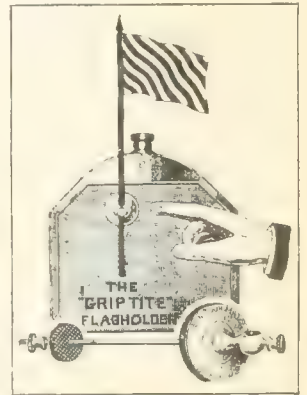
"DICKBALATA" SOLES.

The first successful substitute for leather soles was the Dick gutta percha sole used in England for many years. It is therefore very natural that its makers should bring out a balata sole. The new "Dickbalata" soles have been tested by a council of medical men and pronounced perfectly hygienic; in fact, being entirely unaffected by rain, snow or damp, they act as safeguards to health, and retain their shape and smart appearance to the finish. The material is light, yet durable, and it is claimed that one pair of these soles will outlast three pairs of leather soles of the same thickness. Also, being machine-made articles, they are uniform in texture and free from the pain-producing ridges frequently found in the ordinary leather sole. [R. & J. Dick, Limited, Glasgow, Scotland.]



"GRIPTITE" FLAG HOLDER WITH RUBBER CUSHIONS.

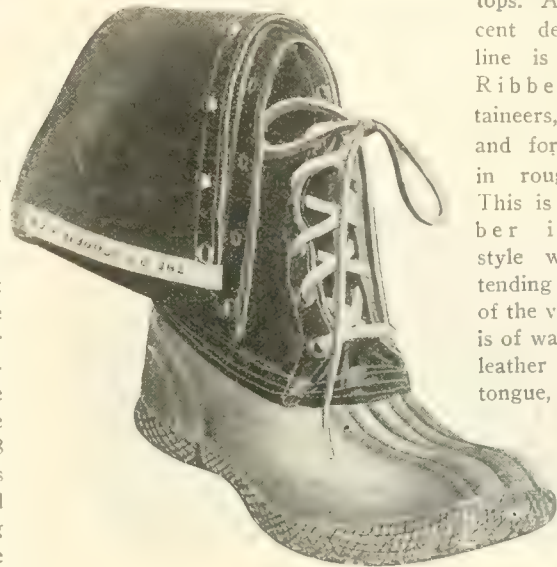
Patriotic emblems are naturally prevalent in these times, and few automobiles are without their insignia of unhyphenated Americanism. A holder which will maintain a flag in an upright position on the front of the radiator of any car has corrugated, heat-proof rubber cushions which rest against the front and back of the radiator and can be easily and quickly attached without the use of tools or clamps. The "Griptite" flag holder is made of polished brass, finished in nickel or black, as preferred, and is fastened in position by a small thumb nut. [Bon Tour Manufacturing Co., Cobleskill, New York.]



HIPRESS RUBBER.

Every year there is an increase in the number of people who are discarding rubber boots and wearing, instead, perfections

with laced leather tops. A sample of recent design in this line is the Hipress Ribber for mountaineers, lumbermen, and for heavy work in rough countries. This is a heavy rubber in perfection style with ribs extending the full length of the vamp. The top is of waterproof grain leather with a bellows tongue, large eyelets and hooks and a leather lacing. [The B. F. Goodrich Co., Akron, Ohio.]

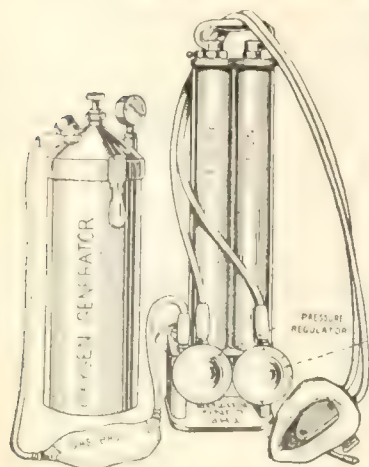


ELLIS 4 IN 1 RUBBER STAMP.

The Ellis 4 in 1 stamp, as its name indicates, comprises four distinct uses within the one article. It has a revolving bar which will take a die 3/16 by 1 inch, suitable for any desired word, the words regularly supplied by the manufacturer being "Paid," "Received," "Answered," and "Entered," in molded rubber lettering. The bar can be revolved by pressing the spring inward and turning the small knob on the outside of the frame. The customary revolving dating device with raised lettering on rubber strips, imprints the date just below the word desired. The body of this convenient office accessory is made of nickel-plated steel with a black enameled handle. [Ellis Time Stamp Co., 229-231 West Illinois street, Chicago, Illinois.]



LUNG MOTOR WITH OXYGEN GENERATOR.



This complete respiratory outfit, consisting of a lung motor and oxygen generator, is claimed to be simple in operation and exceptionally valuable for use in cases of poisoning from gases and fumes, mining accidents, electric shock, apparent drowning, smoke strangulation, collapse after anesthesia, asphyxia of the new-born, etc. The hose and pneumatic face pad of the metal lung motor are provided with rubber tips, and a rubber esophagus tube is used to prevent air from entering the stomach. The metal face mask attached to the tubing has a soft rubber covering to go over the face and nose. [Life Saving Devices Co., 180 North Market street, Chicago, Illinois.]

HOWARD'S IDEAL BATHING CAP.

The primary purpose of bathing caps, namely, to keep the hair dry, is claimed to be achieved in an unusually successful manner in the cap shown herewith, by means of a peculiar form of construction. This cap is made of pure gum, with tapered instead of the customary square-cut sides. It is meeting with



approval among professional swimmers and divers, as well as those frequenting swimming pools and the seashore for pleasure only, since it affords complete protection for the hair and may be worn under any form of fancy silk cap, if desired. [The Ohio Rubber Co., 228-230 W. Seventh street, Cincinnati, Ohio.]

THE HANDY RUBBER BAND

Advice to anglers is given by "All Outdoors" to the following effect:

A half dozen rubber bands are handy things to have with you when you start out to whip a stream and leave your rod case behind. The bands are easily carried and serve nicely to hold your rod joints together when your day's sport is over and the rod is taken apart. String does not answer the purpose as well, and a case is in the way. You certainly need something to hold the joints together if you have any walking to do, unless you wish to have them spreading out and calling for your constant attention.

THE "J. T." WIND-SHIELD CLEANER.

In the wind-shield cleaner shown in the accompanying illustration the familiar "squeegee" principle is utilized. A strip of rubber is mounted on an arm which is connected through a pivotal joint with a similar arm, or handle, on the driver's side of the shield. To clean the wind-shield the rubber is moved about in a

circular direction by means of the handle. This handy accessory is supplied in three styles, shown herewith, two having removable rear arms, so that attachment can be made through the glass or the wind-shield frame, respectively, and the third being provided

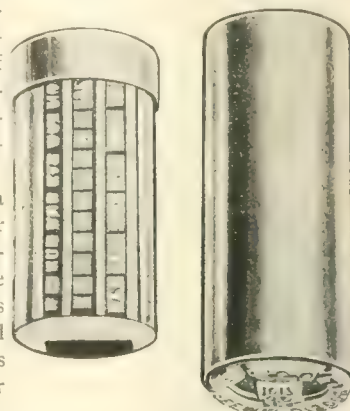


with a spring clip at the pivot joint to be sprung over the frame. These cleaners are easy to apply and present a good appearance on the car. [The J. T. Auto Devices Co., 3535 Euclid avenue, Cleveland, Ohio.]

THE "LEGAL" DATER.

The new dater here illustrated is designed to combine a variety of uses with compactness of form. It is a self-contained type dating device that can be carried in the pocket, and includes all the elements of self-inking and type changing, thus facilitating its application at all places and under any conditions.

The die is mounted on a round, molded rubber air cushion arranged with mortise for the standard size date. The dates themselves are arranged in a grooved cylindrical block which forms the core of the case, the other side of the block being recessed to carry a tube of ink and a pair of tweezers. The inking pad, which is in constant contact with the printing die when the



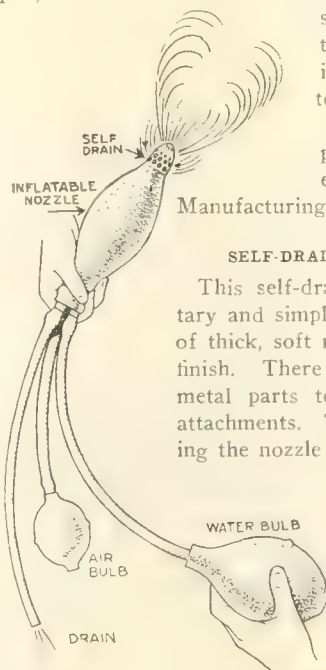
stamp is closed, is contained in the cover or cap; simply removing this makes the stamp ready to print.

A special modern feature is the provision for cancellation of revenue stamps. [The R. H. Smith Manufacturing Co., Springfield, Massachusetts.]

SELF-DRAINING SOFT RUBBER SYRINGE.

This self-draining syringe is complete, sanitary and simple in operation. It is hand-made, of thick, soft red rubber with a highly polished finish. There are no water valves nor other metal parts to corrode, and no hard rubber attachments. The inflatable envelope surrounding the nozzle acts as an adjustable guard, preventing injected fluid from escaping.

By means of a small inflating bulb, provided with the syringe, the envelope is easily inflated to the required size, and this inflatable feature conforms the nozzle into a vaginal dilator of value to



physicians in surgical use, etc. [The Ideal Rubber Co., Los Angeles, California.]

The Editor's Book Table.

ANNUAL CHEMICAL DIRECTORY OF THE UNITED STATES.
Edited by B. F. Lovelace. Williams & Wilkins, Baltimore, Maryland.
[Octavo, cloth, 305 pages. Price \$5, postpaid.]

THIS, the first issue of the Annual Chemical Directory of the United States, makes its appearance at a peculiarly opportune time, when the importance of the chemical industry is realized as never before, and when this industry in America is manifesting a progressive spirit of accomplishment which it has never known before. The scope of the volume is comprehensive, the contents accurate, and the arrangement such as to render the desired address almost instantly available. It may well find a place in the office of every business in which chemistry in any form plays a part, for its twelve sections contain a great fund of helpful information. To the purchasing agent of a rubber factory it is invaluable. Whether it be desired to buy chemicals or laboratory equipment, to employ a professional chemist, to consult laboratories, colleges, experiment stations, Federal or State officials, to cooperate with chemical societies, or refer to chemical publications, the necessary individual or firm name will be found under the proper heading. All listings have been made gratis and without regard to the advertising. Each section is alphabetically arranged throughout; first by subheads, then by states and finally by names.

Chemists are classified as consulting, analytical, and chemical engineers; laboratories, as Federal and State, municipal, industrial and professional. There are lists of American and foreign colleges offering courses in chemistry, experiment stations, technical and scientific societies, chemical journals and important books of 1916-1917. The survey of 1916 devotes some space to the development of synthetic rubber in Germany, which can now be produced at \$1 per pound, estimated on the basis of the prices of raw materials in August, 1914. Among the newer devices and methods are mentioned a new double-bladed rubber masticator, a new non-corrosive insulating material, and the use of Bakelite in the making of pulleys and noiseless gears.

LES CHOLESTEROLS AU POINT DE VUE SCIENTIFIQUE ET Industriel. By André Duboscq, 49 Rue des Vinaigriers, Paris, France.
[Octavo, 10 pages paper. Price, 5 francs.]

This booklet consists of a collection of articles and experiments concerning cholesterol, which originally appeared in our esteemed French contemporary, "Le Caoutchouc & la Gutta-Percha." The author has treated, with his usual regard for detail and completeness in experiments, observations and tables, such subjects as: Presence of cholesterol in greases and resins of rubber; proportion of cholesterol in the acetone extracts of rubber; analysis; chemical, physical and physiological properties; physical and chemical structure, and ethers of cholesterol.

RUBBER COMPANIES' ACCOUNTS. FOR PRODUCING AND NON-Producing Companies. By R. S. Stewart, C. A., and F. C. Ebbels, with a preface by Herbert Wright, A.R.C.S., F.L.S., Gee & Co., London, England. [8vo, 128 pages, cloth. Price, 7s. 6d., postpaid.]

Plantation accounting is a comprehensive and intricate matter because of the great amount of detail required for monthly reports from the manager on the estate to the directors of the company in England, America or elsewhere, and this is the first book yet published on the subject. The authors have made an exhaustive study of the systems of leading companies and in the light of their own extensive experience have combined the best ideas into a seemingly adequate and nearly ideal system which will tend toward more sound financial methods in the management both on estates and in company offices. An industry involving a capital of nearly \$500,000,000 and 1,500,000 planted acres certainly offers opportunities for standardized accounting, and with that in view suggestions are solicited with the idea of extending the scope of the book at some later date.

OFFICIAL BULLETIN. E. S. ROCHESTER, EDITOR, 10 JACKSON Place, Washington, D. C. [8 pages. Price, \$5 a year.]

For the purpose of circulating authoritative news pertaining to government activities and the conduct of the war, "The Official Bulletin" has made its appearance and henceforth will be published daily under order of the President by the Committee on Public Information. This committee is composed of the Secretary of State, the Secretary of War, the Secretary of the Navy and George Creel as civilian chairman. E. S. Rochester is editor. The early issues consist chiefly of proclamations and executive orders of the President and stimulating publicity relative to the "Liberty Loan" and army and navy enlistments. Copies of this 8-page, 3-column newspaper will be furnished without charge to newspapers, all post offices in the United States, public officials and agencies of a public or semi-public character equipped for the dissemination of official news of the United States Government. To others the subscription rates by mail are \$5 a year.

NEW RUBBER JOURNALS.

NOTWITHSTANDING the high cost of living and the higher cost of paper, inks and printing throughout the world, not to mention the threat of almost prohibitive American postal rates proposed in the new war tariff bill, there seems to be no lack of courage on the part of those eager to enlighten the rubber trade, as shown by the following announcements.

ARCHIEF VOOR DE RUBBERCULTUUR IN NEDERLANDSCH-INDIE.

Under the above title (Archives of the Rubber Plantation Industry in the Netherlands Indies), and in the form of a monthly magazine $7\frac{1}{2}$ by $10\frac{1}{2}$ inches, will be published the reports of the Java rubber experimental stations at Buitenzorg, Salatiga, Malang and Djember, and the Sumatra station at Medan, which have formerly appeared as various bulletins and pamphlets. These will be issued in Dutch as before, but accompanied by extensive summaries and complete tabular matter in English. Book reviews and abstracts from the rubber journals of the world will be in Dutch only. This important innovation commends itself to British and American readers because the committee of editors, composed of the directors and officers of the experimental stations, consists of such well-known scientists as K. Gorter, J. G. Fol, F. C. van Heurn, H. C. Pratt, W. Roepke, A. A. L. Rutgers, A. J. Ultée, O. E. de Vries, Th. Wurth and H. J. Hellendoorn, Buitenzorg, Java, as Editor-Secretary. The features of the first issue, dated February, 1917, consist of four articles by Dr. O. de Vries, as follows: "Sugar as a Coagulant for Crêpe Rubber," "Influence of Rolling on Crêpe Rubber," "The Influence of the Rubber Content of Latex on the Inner Qualities of the Rubber," and the "Influence of the Amount of Acetic Acid on the Inner Qualities of the Rubber."

"THE RUBBER AGE."

Under this comprehensive title a new American rubber trade journal, edited by Herbert M. Williams, is being published by the Gardner, Moffat Co., Inc., New York City. It appears semi-monthly at a subscription price of \$1 a year, its announced main purpose being "to assist in spreading such known technical information as can be obtained from the laboratories and factories, as well as from the technical and engineering press," in the belief "that a better and broader knowledge of the business and commercial problems and market conditions, will be of service to both the manufacturers and those to whom they sell, and will bring about better understandings and more mutual cooperation." The first issue, dated March 26, consists of 48 pages about equally divided between reading matter and advertising, and includes four feature articles, news of interest to the Amer-

ican rubber industry, and several market departments, that devoted to manufactured rubber goods being an original conception.

INDUSTRIAL NEWS SURVEY.

Busy men will welcome the "Industrial News Survey," now being published weekly by the National Industrial Conference Board, 15 Beacon street, Boston, Massachusetts, an organization consisting of 16 trade associations of employers, including The Rubber Association of America, Inc. The news which every executive in the industrial world wants to know is presented in crisp, concise form and printed on several single leaflets, 5½ by 8½ inches, wire-stitched together. The regular subscription price is \$2 a year, but it may be procured by members through The Rubber Association of America for \$1 a year postpaid, which barely covers the cost of production and mailing.

NEW TRADE PUBLICATIONS.

THE Link-Belt Co., Chicago, Illinois, is noted for the beauty and usefulness of its various catalogs and trade publications. Several attractive pamphlets recently received are: "Traveling Water Screen for Condenser Intakes," "Increasing Profits by Saving Expense in the Handling and Storing of Coal and Ashes," "Some Modern Coal Tipples," "Blue Diamond Coal Company's Tipple," Link-Belt and Sprocket Wheels for Saw-mills," "Link-Belt Wagon and Truck Loaders," and "Cement Mill Equipment." Each of these booklets carries a message of interest to manufacturers and we understand that the company will send copies of any or all of them to those who may write to the concern requesting them. An elaborate work and a book well worthy of being in every engineer's library is the "Link-Belt Silent Chain Data Book No. 125," numbering 128 pages and handsomely bound in imitation leather. It is profusely illustrated and gives figures and tables of matters pertaining to the various belts manufactured by this company, their requirements, horse power, etc. The belts are fully described and pictured, directions given for selecting, determining length of chain and for installing and starting. The tables of transmission of horse power are particularly valuable. This company has also published as a hanger in the national colors, a portion of President Wilson's proclamation in such large type that "he who runs may read." It is a handsome and appropriate hanger for a business office. We are informed that the company will send a copy of this to anyone who may address a request to the Chicago plant.

* * *

The Westinghouse Electric & Manufacturing Co., of East Pittsburgh, Pennsylvania, has had printed in an attractive 16-page pamphlet, under the title "A Plea for Defense of Human Rights and Liberty," the memorable address of President Wilson before Congress on April 2, 1917, in which he advised a declaration of war against Germany.

* * *

A very highly colored and striking hanger issued by the Kansas City Tire & Rubber Corp., Kansas City, Missouri, to advertise its Bull tires, represents a formidable and ferocious bull charging one of these tires which, however, shows no damage from the onslaught. The hanger is one which would certainly attract attention when placed in any garage or store which may be favored with this brilliant advertisement.

* * *

The Pirelli General Cable Works, Limited, London, England, has sent out a handsome booklet describing and picturing the new Southampton works of that company. The 28 pages of fine coated paper contain many excellent half-tones of the works, one showing the main buildings in a group on the waterfront, while other pictures show details of the several buildings and interior views of the various departments. All of these are described

clearly but briefly, and at the end are views of the various factories of Pirelli & Co. in Italy and Spain, and on another page some of the plants of the General Electric Co., Limited, in England, both of which companies combine to form the Pirelli General Cable Works of Southampton and London.

* * *

The Dunlop Tire & Rubber Goods Co., Limited, of Toronto, is sending out an excellent catalog of its automobile tires and sundries. This is generously illustrated with half-tones of the tires, treads, tubes and sundries which have made the name of Dunlop famous. Each article is pictured and described, and the 40-page booklet is a fine specimen of trade catalog printing.

A TRAVELING EDUCATIONAL DISPLAY.

The Kaufman Rubber Co., Kitchener, Ontario, is now maintaining a unique window display service. Trunks are fitted with all of the equipment for dressing a window, including crude rubber and rubbers in the different stages of manufacture. This trunk is sent out to the retailer for his use and when through he repacks and returns it to the nearest branch. The trunks contain besides crude rubber, strips of soling, the various pieces, and all materials used in the process of making tennis shoes and rubbers. The company has found that merchants appreciate this service and use it to good advantage.

RUBBER TRADE INQUIRIES.

THE inquiries that follow have already been answered; nevertheless they are of interest not only in showing the needs of the trade, but because of the possibility that additional information may be furnished by those who read them. The editor is therefore glad to have those interested communicate with him.

[294.] A correspondent is in the market for a 6 by 12-inch experimental mixing mill.

[295.] An inquiry has been received for names of concerns manufacturing hard-rubber-lined iron pipe and fittings.

[296.] Names of manufacturers of machines for cutting eyelets in outside blow-out patches are requested.

[297.] Information is sought concerning the sort of wire cloth used in straining latex in the Far East.

[298.] The address of the selling agents of Ocotillo gum is desired.

[299.] Names and addresses of manufacturers of rotary rubber scrap cutters have been requested.

TRADE OPPORTUNITIES FROM CONSULAR REPORTS.

A merchant in France is in the market for gold stylographic and fountain pens. Report No. 24,298.

An agency for the sale of rubber is desired by a company in Sumatra. Report No. 24,388.

A firm in India wishes to secure an agency for the sale of rubber goods and rubber tires for carriages and motor cars. Report No. 24,408.

An applicant in the Straits Settlements desires to purchase bare fabric automobile tires, without the rubber tread. Report No. 24,427.

A firm in England is in the market for india rubber buttons for use in making garters. Report No. 24,504.

A man in Brazil wishes to purchase three or four 12-screw rubber diving suits. Report No. 24,530.

Rubber wheels and other rubber goods are desired by an applicant in France. Report No. 24,535.

The Norwalk Tire & Rubber Co., Norwalk, Connecticut, advertises its tires in Los Angeles, California, by a unique method. A trained goose parades the streets of the city, garbed in suitably labeled attire.

The Obituary Record.

A PROMINENT PLANTATION ADVOCATE.

SIR ALEXANDER SHARP BETHUNE, who died in England recently, was a pioneer of the rubber planting industry in Ceylon. Starting in the tea planting business at the early age of 20 years, he was connected with some of the large tea plantations and was prominent as a planter from 1880 until about the first of the present century, when he left Ceylon to become a partner with Messrs. Charles Hope & Co., of London. He identified himself with a large number of planting enterprises and when



SIR ALEXANDER SHARP BETHUNE

rubber became prominent he became promoter for several leading planting companies. He was a member of the Rubber Growers' Association and, for a period, its chairman, in which capacity he was largely instrumental in the dispatch of chemists to study scientific questions on the spot. He was an earnest advocate for the standardization of rubber. For many years he was London correspondent for the "Times of Ceylon" and a few years ago he took an extended business trip which not only included Ceylon but East Africa, investigating the extraction of latex of the *Funtumia elastica* and later writing interestingly of his trip from the rubber man's standpoint, for the above mentioned journal. The story of his claim to the baronetcy is a romantic one. Mr. Alexander Bethune, by authority of the Lyon King of Arms, becoming Sir Alexander Sharp Bethune, Bart., in December, 1916. At the time of his death he was a director in a large number of tea and rubber plantation companies. He had a large circle of friends, in both England and Ceylon, who mourn his loss.

A LIFE LONG RUBBER SPECIALIST.

Terrence McCarty, for nearly 50 years connected with the rubber footwear industry, died in Providence, Rhode Island, on May 4, following a surgical operation.

He was born in Bristol, Rhode Island, March 19, 1856. His education was limited principally to the evening schools of that town, for he went to work in a cotton factory when eleven years old. He entered the employ of the National India Rubber Co. as errand boy in 1868, and worked his way up, becoming superintendent in 1893. Always ambitious, he resigned that position two years later, and, with Fred L. Smith, started the Byfield Rubber Co., which was sold to the United States Rubber Co. some years

later. In 1905 he formed the Consumers' Rubber Co. to manufacture insulated wire. Financial troubles overtook this concern in 1911. In 1914 he organized the Narragansett Rubber Co., which is in successful operation, manufacturing rubber footwear and tennis shoes, and of which he was president and treasurer at the time of his death. As an inventor he secured a patent for an ingenious and practical buckle for overshoes.

Mr. McCarty was described by his friends as a "rough diamond." That is, his education did not go far beyond that of rubber manufacture, which he knew from the wash-room up. He was warm-hearted, enthusiastic, a great worker, and a loyal, dependable friend. His wife died several years ago, but he is survived by two daughters and nine grandchildren, a brother and two sisters.

A GRANDSON OF CHARLES GOODYEAR.

Nelson Goodyear, grandson of Charles Goodyear, the discoverer of vulcanization, died at his home in New York City, after a very short illness, aged 44 years.

He was born in Brooklyn, New York, but his early boyhood was spent in the vicinity of Boston, Massachusetts, and his education received at Hill School, Pottstown, Pennsylvania, the Metropolitan School of Fine Arts, New York City, and in Paris. Like his ancestors, he was an investigator and inventor. His father created the welt sewing machine, which revolutionized shoe manufacturing. Nelson Good-



TERRENCE MCCARTY

year's studies were in the lines of architecture, engineering and the development of acetylene for lighting and mechanical work. His automatic buoys are used by the United States Government, among them a 13-ton lighting and whistling buoy at the Panama Canal. He perfected acetylene and oxygen welding and cutting equipment, also apparatus for lighting and projection by acetylene. In architecture his most notable work is the wonderful dome of Columbia University, the only self-sustaining masonry dome in America. His last work was on a trench gun on original lines, a patent for which is now pending in Washington.

He traveled extensively, visiting Egypt, Athens and Rome with his uncle, Prof. W. H. Goodyear, Curator of Fine Arts at Brooklyn Institute. In Italy and France he studied architecture,



Paul Fournier, L. to

NELSON GOODYEAR

and later in Germany he investigated gas and oxygen welding.

Mr. Goodyear was an ardent lover of the sea and an ocean voyage or one in a 30-foot yawl was equally fascinating to him. He was also a splendid horseman. In 1903 he married Katharine Goodyear who is also a grandchild of Charles Goodyear. She survives him, as do also a daughter and a son.

In many respects, Mr. Goodyear inherited the character of his grandfather; the same invincible determination, the same spirit of buoyancy and optimism, above all the genius for investigation and invention which have made the name famous for all time.

PRESIDENT OF SEVERAL CORPORATIONS

Francis C. Van Dyk, for several years president of the Sterling Tire Corporation, Rutherford, New Jersey, died at his residence, at Paterson, New Jersey, Monday, May 21.



FRANCIS C. VAN DYK.

He was born in San Juan, Porto Rico, 80 years ago, and was brought to this country at an early age. When 13 years old he entered the dry goods store owned by his uncle at New Brunswick, New Jersey, nine years later forming a partnership with his employer, and establishing a dry goods store in Paterson. Five years later, he acquired the entire ownership of the business, which eventually developed into one of the largest and most popular

department stores in the State of New Jersey.

Mr. Van Dyk was interested in a number of outside enterprises, and in 1894 retired from the dry goods business. For several years he had been interested in the Sterling Tire Corporation, and for the last four years its president. He was also president of James Simpson & Co., silk manufacturers; president of the Laurel Grove Cemetery Co., president of the Cedar Cliff Land Co., the Broadway Land Co., and the Van Dyk Land Co.

For 45 years he was vice-president and director of the Second National Bank of Paterson, and for 25 years was president of the Board of Directors of the Paterson Orphan Asylum.

He was active in religious and church work as in his business affairs and was ruling elder of the First Presbyterian Church, member of the Board of Trustees, and at the time of his death, elder of the Church of the Redeemer.

TWO SCORE YEARS A FOOTWEAR DISTRIBUTER.

Peter Gauthier, manager of the Ottawa branch of the Miner Rubber Co., Granby, Canada, died at his home in Ottawa, April 19. For 40 years he was identified with the rubber footwear trade in Canada, and for the last 16 years at Ottawa. He was well known in the Ottawa Valley and Eastern Ontario, where he had many friends in the retail footwear trade.

ACTIVELY IDENTIFIED WITH RUBBER CEMENT MANUFACTURE.

James A. Law, president of The Eureka Cement Co., Newark, New Jersey, died April 28, at Maplewood, New Jersey, in his sixty-fifth year, of a complication of diseases.

Until the last few years he had been actively identified with the manufacture of rubber cements for the shoe, hat and leather industries, having started the business nearly 30 years ago.

He is survived by a widow and son, the latter being actively identified with the present business and its branches.

INTERESTING LETTERS FROM OUR READERS.

A PHILIPPINE RUBBER PLANTING ADVISER.

TO THE EDITOR OF THE INDIA RUBBER WORLD:

DEAR SIR—I am in a position to be of practical assistance to prospective rubber planters in the Philippines, as I have had considerable plantation experience and am leaving for Mindanao soon. An Englishman, I was born in Ceylon, where my father and grandfather were planters, and my mother still has valuable tea and Para estates. My father interplanted coffee with tea and got returns from the tea in 18 months, and later my brother interplanted the tea with Para rubber, both products growing well together.

I began life as a planter, and have opened up three estates. More recently as a traveling dentist riding through the planting districts, I have established several large nurseries. I can select land and plant it with rubber and other products, which will give a quick return. As proof of my ability I enclose a testimonial from the late John Ferguson, C.M.G., a member of the legislative council in Ceylon, editor and proprietor of the "Observer," and owner of a tea estate.

T. H. STEPHENS.

Cosmopolitan Building, Manila, March 16, 1917.

THE TALK IN SINGAPORE.

TO THE EDITOR OF THE INDIA RUBBER WORLD:

DEAR SIR—There is much local discussion at Singapore and in this section about American companies obtaining title to land for rubber plantations. Planters here reason that in a measure it will reduce the number of their customers when some of their former customers are producing for themselves. To further explain, it appears that the General Rubber Co. may desire to own a plantation on the peninsula in addition to its plantations in Sumatra, and it is blamed for the entire project, as it is established here better than others. Three of the big American manufacturers, it is rumored, are looking for land to light on, and one took an option on 20,000 acres, which has expired without exercising it. All this gives foundation for much discussion on the subject of the "American invasion," regarding which not an American has raised his voice nor written a line for print so far.

The actual average price the planters obtained for their 1916 rubber was three shillings per pound—a fraction more, perhaps, but I placed it at 60 cents to be sure to be conservative. This difference of some 12 cents per pound would make the aggregate of millions yet higher which Americans paid in 1916 to this part of the world.

And yet more, the most reliable information I have obtained here on the total product of rubber, was a little over 164,000 tons of plantation, which figure I think will be found later on about correct, and this would still add to the total amount in gold dollars paid by America. If the balance of the world (South America, Africa, Central America and Mexico) produced 50,000 tons in 1916, we have a grand total of 214,000 tons as the world's production for 1916.

Great Britain has passed a law, and this dependency has adopted it, taxing automobiles for every purpose and sold at any price—whether a Ford or a Pierce-Arrow—the round sum of 299 cents (Straits Settlements currency) each as a means of revenue.

The council of the government contemplates raising the tax on exported rubber from here and it will be based upon pounds-weight, quality having nothing to do with it.

Singapore, April 10, 1917.

L. E. J.

News of the American Rubber Trade.

PRESIDENT HOTCHKISS TO SUPERINTEND RUBBER PRODUCTION.

H. STUART HOTCHKISS, president of the General Rubber Co., vice-president, secretary and treasurer of The L. Candee & Co., director and member of the executive committee of the U.



H. STUART HOTCHKISS

S. Rubber Co., and first vice-president of The Rubber Association of America, Inc., is one of a notable committee chosen by the United States Government to superintend the production of raw materials for the war. It will serve under Bernard M. Baruch, chairman of that division of the National Council of Defense. Mr. Hotchkiss is chairman of the Rubber Committee.

Other chairmen are Judge Elbert H. Gary, head of the

United States Steel Corporation; A. C. Bedford, head of the Standard Oil Co.; Horatio S. Rubens, director of the United States Industrial Alcohol Co., alcohol; Arthur V. Davis, aluminum; Thomas F. Manville, asbestos; Charles F. Brooker, brass; W. H. Childs, coal tar by-products; Robert H. Downman, lumber; Clinton H. Crane, lead; L. W. Kingsley, mica; Ambrose Monell, nickel; Henry Whiton, sulphur, and Jacob F. Brown, wool.

RUBBER COMPANY SHARE QUOTATIONS.

The following market quotations of shares of rubber manufacturing companies on May 25 are furnished by John Burnham & Co., 115 Broadway, New York City, and 41 South La Salle street, Chicago, Illinois:

	Bid.	Asked.
Ajax Rubber Co. (new).....	72	72
Firestone Tire & Rubber Co., common.....	108	108
Firestone Tire & Rubber Co., preferred.....	106	108
The B. F. Goodrich Co., common.....	52	52 3/4
The B. F. Goodrich Co., preferred.....	100	107 1/2
The Goodyear Tire & Rubber Co., common.....	200	203
The Goodyear Tire & Rubber Co., preferred.....	106	108
Kelly-Springfield Tire Co., common.....	53 1/2	55
Kelly-Springfield Tire Co., preferred.....	87	94
Miller Rubber Co., common.....	196	200
Miller Rubber Co., preferred.....	104	106
Portage Rubber Co.....	150	155
Swinehart Tire & Rubber Co.....	65	70
United States Rubber Co., common.....	57 3/8	58
United States Rubber Co., preferred.....	105	106

RUBBER COMPANY DIVIDENDS.

The Republic Rubber Co. paid a quarterly dividend of 2 per cent on common stock on May 1 to stockholders of record April 25. A dividend of 1 3/4 per cent has been declared on preferred stock, payable June 1 to stockholders of record May 20.

The Ajax Rubber Co. has increased its dividend rate from \$1.25 per share to \$1.50 per share, the declared dividend at the new rate payable June 15 to stockholders of record May 31.

RUBBER SCRAP DIVISION MEETING.

The Rubber Scrap Division of the National Association of Waste Material Dealers held a very satisfactory meeting, May 15, at the Hotel Astor, New York City. The recommendations relating to packing and shipping specifications made by the Rubber Reclaimers' Division of The Rubber Association of America, Inc., were adopted with a few minor changes. The next meeting will be held June 19-20. A new circular on packing and a pamphlet on trade customs between dealers and consumers will be issued under date of July 1, 1917.

CANADIAN CONSOLIDATED ELECTIONS.

At the recent annual meeting of the Canadian Consolidated Rubber Co., Limited, Montreal, Canada, directors were elected for the current year, as follows: Walter Binmore, R. C. Colt, Col. S. P. Colt, W. A. Eden, R. E. Jamieson, V. E. Mitchell, K. C., E. W. Nesbitt, M. P., W. G. Parsons, R. B. Price, T. H. Rieder, W. H. Robinson, Homer E. Sawyer, A. D. Thornton, Elisha S. Williams.

At a subsequent meeting of the directors, the following officers were elected: T. H. Rieder, president; V. E. Mitchell, K. C., vice-president; W. A. Eden, secretary; Walter Binmore, treasurer; R. C. Colt, assistant secretary, and J. P. B. Daigneau, assistant treasurer.

UNITED STATES RUBBER CO. ESTABLISHES NEW FOOTWEAR PLANT.

The United States Rubber Co. has acquired the plant originally established as the Banner Rubber Co., at Kenrick and Bittner streets, Baden, St. Louis, Missouri, and will operate it exclusively for the manufacture of rubber footwear. Charles R. Haynes, superintendent of The Goodyear Metallic Rubber Shoe Co., at Naugatuck, Connecticut, will be in general charge of this St. Louis plant, the preliminary work being in charge of J. M. Rice, superintendent of The L. Candee & Co. plant, located at New Haven, Connecticut. It is hoped within the next six months to develop a production of at least 10,000 pairs a day of rubber shoes and arctics.

CONDENSITE PATENTS RECOGNIZED BY GENERAL BAKELITE CO.

Litigation between the Condensite Co. of America and the General Bakelite Co. has been terminated, and the General Bakelite Co. agrees to recognize the validity of the Condensite (Aylsworth) patents Nos. 1,065,495, dated June 24, 1913, and 1,137,374, dated April 27, 1915, and to pay substantial royalties thereunder.

The patents in question cover broadly all varnishes, lacquers, enamels and cements with which a phenolic condensation product (such as condensite or bakelite) is combined with a double solvent of either of the following types: first, a readily volatile organic liquid and another organic liquid immiscible with, and of a higher boiling point than water, or second, a liquid oxygen compound of the aliphatic series and a compound of the benzene series soluble therein, or a cyclic hydro-carbon.

WAGE INCREASES IN NEW YORK.

In the rubber and gutta percha establishments of New York State the number of employes was 7.9 per cent greater than in March, 1916, and their total wages were 28.7 per cent greater. The gains over February, 1917, were 1 and 7.4 per cent, respectively.

The chemical industries also reported increases in wages greater than in number of employes, the excess over March, 1916, being 11.4 per cent in number and 28.6 per cent in wages.

RUBBER SHIP CRIPPLES A U-BOAT.

BECAUSE the rubber industry is so dependent upon freedom of the seas it seems a singular coincidence that a ship in the direct London-New York service, well known for its frequent rubber cargoes, should have been the first American armed merchantman to cripple a German submarine. This distinction goes to the "Mongolia" of the Atlantic Transport Co., a vessel of 13,638 tons under the command of Captain Emery Rice. On April 19, the 142nd anniversary of the Battle of Lexington, the gun crew under Lieutenant Bruce R. Ware fired America's first shot in the war and scored a clean hit at 1,000 yards, shattering the periscope, thereby repelling the U-boat attack. On her return trip to New York the "Mongolia" was twice attacked by submarines without damage. A sister ship, the "Manchuria," is in the same service.

TRADE NOTES.

The Omaha, Nebraska, branch of the United States Rubber Co. has leased the ground at the corner of Ninth and Douglas streets, and will build there a reinforced concrete, brick-faced, fireproof building of five stories. The American Hand Sewed Shoe Co., which is a branch of the United States Rubber Co., will occupy a portion of the building.

Hagemeyer & Brunn, dealers in crude rubber, announce the removal of their offices to 82 Beaver street, New York City.

The Canadian Consolidated Rubber Co., Limited, of Toronto, sent out last month a new footwear price list, which shows an average advance of 2 to 3 cents on low rubbers, and 10 to 15 cents on boots. Lumbermen's gum and duck goods are advanced 10 cents a pair.

The Third National Exposition of Chemical Industries will be held at Grand Central Palace, New York City, the week of September 24. A large number of leading houses have already signified their intention to exhibit.

O. A. Barnard Co., dealer in fabrics for the rubber trade, has opened an office at 50 East Forty-second street, New York City.

The first of a series of suits aggregating several millions of dollars has been instituted by Ferdinand Ephraim, of San Francisco, against Salvador Madero, of Mexico, on the ground that the latter, representing large interests in Mexico, has infringed his patents for extracting rubber from the guayule plant, thereby causing Mr. Ephraim losses to the extent of \$8,000,000.

The well-known chemical and color house of J. Early Wood, New York City, is now represented on the Pacific Coast by L. T. Kirch, 461 Market street, San Francisco, California, who has been appointed sales manager for that territory.

E. M. & F. Waldo, manufacturers of compounding ingredients extensively used in rubber manufacture, have recently increased their facilities and office space, having taken a commodious suite of offices occupying the entire center section of the fourth floor of the Bowling Green Building, 11 Broadway, New York City.

The Habirshaw Electric Cable Co., New York City, has purchased property on the Saw Mill River Road, Yonkers, New York, on which it will erect a one-story brick factory building, 60 by 242 feet, to be used as a wire-drawing department, the cost being estimated at \$60,000.

The office of Ralph Croft, crude rubber broker, is now located at 72 Trinity Place, New York City.

J. A. McKenzie recently sailed for the Antipodes, as local Australasian manager for the United States Rubber Export Co., whose business there will be conducted under the name of the India Rubber Products Co., Limited. Mr. McKenzie was formerly branch manager of the Canadian Consolidated Rubber Co., Limited, at Victoria, B. C. D. F. Moncur, formerly of the Montreal office of the Canadian Consolidated company, will act as Mr. McKenzie's assistant.

JOHN J. CHANDLER.

JOHN J. CHANDLER, vice-president of the Hoggson & Pettis Manufacturing Co., New Haven, Connecticut, is a man widely known in the rubber trade, his entire business life having



JOHN J. CHANDLER.

been devoted to the engraving of rolls for rubber manufacturers. When S. J. Hoggson started as a die sinker and engraver in 1849 he had little idea of the great growth of the business he founded. Thirty years after, he took a partner, George C. Pettis, and as the business grew it was incorporated. The success of this concern in no small degree is due to John J. Chandler, who became an apprentice in June, 1880. In the following years he became one of the

most expert roll engravers in the country. He rose to the position of foreman, then superintendent, and later vice-president. In this latter capacity he has traveled extensively throughout the United States and Canada, and his face is familiar, he having attended practically all the conventions and exhibitions of the rubber trade which have been held in the past ten or fifteen years, while his work is held as a standard in leading mills both in this country and abroad.

PERSONAL MENTION.

A. Staines Manders, alert, indefatigable and far-seeing, is planning a monster rubber exhibition in London in 1919. It is sure to be a success, else he will not hold it, and in the event that the submarine is by that time eliminated, American interest, personal and present, is sure to be great.

Richard Weil, who has become the guide, counselor and friend of many visiting the great rubber plantations in the Far East, has returned from his winter's trip to Java, the Federated Malay States and Ceylon. Although but just landed, he is already making plans for a trip to the same countries next winter.

E. J. Carlin, formerly with the Pioneer Asphalt Co., Lawrenceville, Illinois, has accepted a position in the sales department of the Barber Asphalt & Paving Co., Philadelphia, Pennsylvania.

G. G. Schrieke, representative of the Java-Sumatra Syndicate, Bandoeng, Java, is in the United States with the object of interesting American capital in planting in the Far East. He will sail for Holland shortly and return to this country in September.

CORRECTION.

The May issue of THE INDIA RUBBER WORLD contained a notice to the effect that the Pioneer Asphalt Co., of Lawrenceville, Illinois, had become affiliated with another company in the same line. This was erroneous, as the Pioneer Asphalt Co. has not made any change since its incorporation, nor does it contemplate any. "Pioneer" M. R. Hydrocarbon, manufactured for the rubber trade, is a well known product of this company.

NATIONAL ASSOCIATION OF COTTON MANUFACTURERS.

AT the annual meeting of this organization held at the Copley Plaza, Boston, Massachusetts, April 25 and 26, practically the whole board of government was reelected: Albert Farwell Bemis for president, Russell B. Lowe and W. Frank Shove, vice-presidents; Philip Dana and John E. Rousmaniere for full terms on the board of directors, Thomas H. Rennie for two years to succeed R. M. Miller, resigned, and William B. MacColl for one year, to succeed William N. Kimball, resigned.

All of the many important addresses, including a stereopticon lecture on "The New Cotton Fields of the Southwest," by Walter E. Packard of the University of California Agricultural Experiment Station, El Centro, California, gave indication that the leading men of this industry realize its importance during the present critical period and the imperative need of increased production of factories and farms to help sustain our burden in the European conflict. National policies affecting the war were discussed, and the association expressed itself in favor of selective conscription, daylight saving, and cultivating garden plots, outlined a plan for a fair tax levy to furnish the Government with all the money needed, and called for a firm hand on the limitation of the ultimate destination of exported American cotton. An international cotton conference was advocated to be held immediately upon the conclusion of the present war at some convenient point in the United States, and to be composed of representatives of all branches of the cotton industry in the countries with which we shall at that time enjoy reciprocal trade relations.

R. M. LOEWENTHAL & CO.

R. M. Loewenthal & Co. is the name of a recently organized waste rubber concern which will confine its operations exclusively to auto tire scrap. The head of the new company is Ralph M. Loewenthal, formerly of The Loewenthal Co. and well known in the waste rubber industry. The new company, with offices at 51 East Forty-second street and warehouse in Buffalo, New York, has a highly developed buying and sales organization.

CANADIAN DRAWBACK ON RUBBER FABRICS.

Canadian custom regulations issued under an order in council of February 6, 1917, authorize a drawback of 99 per cent of the customs duties on imported cotton fabrics which are used in the manufacture in Canada of rubber belting, rubber tires, and rubber tubes. Drawback will be allowed only when the duty has been paid not more than three years before the manufacture of the goods and cannot be claimed for a quantity of cotton fabric in excess of the quantity of similar cotton fabric used in the manufacture of rubber belting, tires, and tubes made by the claimant for drawback and exported during the period covered by the claim subsequent to January 1, 1917. Satisfactory proof must be furnished as to the manufacture and exportation of the goods on which drawback is claimed.

FLAG RAISINGS IN RHODE ISLAND.

The employes of the several rubber manufacturing plants in Rhode Island continue to show their patriotism by flag raisings and appropriate exercises, so that "Old Glory" waves triumphantly from numerous staffs and out of many windows at every rubber factory in the State. Flags are now installed in nearly every department at the Davol Rubber Co. plant. There was an elaborate flag raising on May 1 at the boiler room and box factory of the National India Rubber Co.'s plant at Bristol, and a similar flag raising at the office of the factory of the International Rubber Co., at West Barrington, early in the month.

CUTLER-HAMMER ADDS TO PLANT.

Extensive additions to the plant of The Cutler-Hammer Manufacturing Co., Milwaukee, Wisconsin, maker of electric con-



FIRST OF THE NEW UNITS BEING ADDED TO THE MILWAUKEE WORKS OF THE CUTLER-HAMMER MANUFACTURING CO.

trolling devices, are in progress and one of the new buildings is shown in the accompanying illustration. It is of reinforced concrete construction, fireproof throughout, six stories high and extending the length of a city block. Arrangements for daylight and artificial lighting are exceptionally well provided for and a complete air washing system will be installed.

NEW OFFICERS OF THE NARRAGANSETT RUBBER CO.

At a meeting of the stockholders and directors of the Narragansett Rubber Co., Bristol, Rhode Island, held May 17, to fill the vacancies caused by the death of the president and treasurer, Terrence McCarty, Mrs. James P. Murphy and Mrs. Florence F. Sullivan were added to the board of directors. Robert S. Emerson, of Pawtucket, was then elected president and Miss Nora Leahy, treasurer.

Robert S. Emerson, the newly elected president, is well known in the legal profession. He is a member of the law firm of Mumford, Huddy & Emerson, of Providence, Rhode Island. He graduated from Brown University in 1897, and for several years was connected with the selling department of the National India Rubber Co. In 1903 he graduated from the New York Law School, beginning the practice of law the next year. For nine years he was Clerk and Associate Justice of the Tenth District Court of Rhode Island. In 1915 he was elected Judge of the Probate Court at Pawtucket, Rhode Island, which office he now holds. He is also president of the Tilden & Thurber Corporation, of Providence. Mr. Emerson has been associated with Mr. McCarty's business since 1912, when he was appointed receiver for the Consumers' Rubber Co., of which the Narragansett Rubber Co. is the successor, and is thus well qualified to fill the office to which he has just been elected.

Miss Leahy, the new treasurer of the company, was elected secretary of the Consumers' Rubber Co. in 1906, to fill the vacancy caused by the death of Mr. McCarty's son. She is secretary of the Narragansett company and since Mr. McCarty's illness had been assistant treasurer.

TRADE NOTES.

The Twin Tube & Rubber Co., Chicago, Illinois, is preparing to manufacture a general line of rubber goods, specializing in a new type of inner tube for which many advantages are claimed. Joseph F. Davis is president of the company, A. S. Johnson, vice-president, and F. I. Chichester, secretary-treasurer.

The Consumers Rubber Co., Cleveland, Ohio, has acquired the interests and resources of The Cleveland Tire & Rubber Co., and Thomas J. Jones, who has been the directing head of the latter company, is now secretary and treasurer of The Consumers Rubber Co. B. E. Frazier is president, and J. N. Kirby, vice-president and general manager.

At the annual stockholders' meeting of the BeSaw Tire & Rubber Co., Hartville, Ohio, held May 7, the following directors were elected for the coming year: C. A. BeSaw, I. M. Putnam, D. W. BeSaw, G. F. Kline, P. P. Parker, Chas. Von Weise, Mark Kirkpatrick. The following officers were also elected: C. A. BeSaw, president; I. M. Putnam, vice-president; D. W. BeSaw, secretary and treasurer.

Three former employes of the Federal Rubber Co., Milwaukee, Wisconsin, two Austrians and an Italian, met under peculiar circumstances not long ago in Europe. Upon the outbreak of the war each returned to his native land and joined the army. The two Austrians were recently captured in battle, and among the Italian soldiers parceled off to guard them was their co-worker in America. Although nominally enemies, the meeting was a happy one, and the incident served to show how fate separates and brings people together again in real life.

The Standard Tire & Rubber Manufacturing Co., Cleveland, Ohio, has increased its capital stock to \$750,000 by an issue of \$350,000 7-per cent cumulative preferred stock. The growth of the company's business requires the installation of additional equipment to operate the increased volume of production efficiently, and the proceeds of this issue will be used for this purpose at the factory at Willoughby, Ohio. The previous capitalization was \$400,000 in common stock.

At the last stockholders' meeting of the Gryphon Rubber & Tire Corp., New York City, the following officers and directors were elected: Norman W. Peters, president; A. E. Gordon, vice-president and general manager; S. A. Cunningham, treasurer; A. G. Vellek, secretary. Norman W. Peters, A. E. Gordon, S. A. Cunningham, Robert W. Schuette, R. M. Owen, Hicks A. Weatherbee, Dr. D. W. Whipple, Chas. W. Hunt, and Geo. Van Keuren, directors.

The Luck Tire & Manufacturing Co., Jonesville, Michigan, has increased its capital stock from \$500,000 to \$1,500,000.

The Fabricord Tire Co., which recently took over the plant of the American Case & Register Co., of Salem, Ohio, is equipping for the production of 500 tires a day. It is estimated that the factory will be in full operation by the latter part of the year.

A new rubber mill to employ between 300 and 500 men and to be located at Tarentum, Pennsylvania, is said to be projected. The promoter of the prospective plant is Milton Bejach. The new company will be capitalized at from \$500,000 to \$600,000, which will be distributed between local and eastern investors. The product will be tires and tubes.

Construction of several factory buildings is in contemplation by the new Columbus Climax Rubber Co., recently incorporated with a capital stock of \$200,000. Temporary headquarters are located in the Citizens' Bank Building, Columbus, Ohio.

The Giant Tire & Rubber Co. has outgrown its Akron plant and in order to accomplish a much needed expansion has purchased the plant of the Toledo-Findlay Tire & Rubber Co., at Findlay, Ohio. The machinery in the Akron plant will be taken to Findlay and utilized as well as that purchased with the new plant. Twenty skilled workmen and foremen will be sent from

Akron to Findlay, approximately 50 men in all being employed at first, with a gradual increase. The company will enter upon the manufacture of automobile tires at once, and a little later on will manufacture inner tubes and a general line of rubber goods. The capital stock has been increased to \$150,000. The purchase price of the Findlay plant was \$25,000.

The Meyer Rubber Co., Massillon, Ohio, is turning out a line of automobile tires in all standard sizes. Frank Ridge, formerly of the Firestone Tire & Rubber Co., and more recently of the Marathon Rubber Co., is superintendent of the new plant. The officers are, Fred W. Hatchel, president; A. A. Walter, vice-president; W. E. Evans, treasurer; W. S. Lynch, assistant treasurer, and R. J. Hatchel, secretary.

The Anderson Steam Vulcanizer Co., maker of the Anderson steam vulcanizer, has recently qualified to do business in Indiana, its agent being Newton M. Anderson, Worthington, Indiana, also president, treasurer and director of the company. W. D. Schwarting, of Dayton, Ohio, is secretary. This firm was incorporated under the laws of the State of Ohio, September 19, 1916, with a capital stock of \$100,000 and an office at Cincinnati, Ohio. The factory is located at Worthington, Indiana, and all business is transacted from that point.

The Good-Wear Rubber Co., Elyria, Ohio, manufacturer of automobile tires and tubes, has changed its name to The Long-Wear Rubber Co.

The A. J. Stephens Rubber Co., successor to the McFall Rubber & Manufacturing Co., Kansas City, Missouri, whose plant was destroyed by fire on April 12, has opened up at 1318-26 Chestnut avenue, having purchased 150 feet fronting on Chestnut avenue. The new company manufactures tire accessories—inside blow-out patches, outside boots, reliners, patching material, cements and fan belts. Eighty persons are now employed and the number will soon be increased to over 100. A. J. Stephens is sole owner and manager.

The Dayton Rubber Manufacturing Co., manufacturer of airless and pneumatic automobile tires, will display its products in the permanent Dayton Manufacturers' Exhibit being established by The Greater Dayton Association at Dayton, Ohio.

KILLINGLY IS NOW GOODYEAR.

It is particularly appropriate that Connecticut, the state where Charles Goodyear was born, and where many of his experiments were performed, should have a post office bearing his name, and such has now become the official designation of the manufacturing town formerly known as Williamsville and later as Killingly. The cotton mills of the Goodyear Tire & Rubber Co. are in this village, and undoubtedly it was because of this fact that the name has been changed to Goodyear. The company has in successful operation there a large plant for the manufacture of tire fabrics, and this plant is to be enlarged by the erection of several new buildings, among them a storehouse with a capacity of 10,000 bales of cotton, and upon completion of the present building operations the mills will have a capacity of more than 150,000 pounds of tire fabrics weekly.

UNDERWRITERS' LABORATORIES IN NEW QUARTERS.

On May 1 the New York office and testing station of Underwriters' Laboratories was removed to the twelfth floor of the Evening Mail Building, 25 City Hall Place, in order to provide increased space and better facilities for the conduct of their work.

The new building of the Plymouth Rubber Co., at Canton, Massachusetts, is nearly completed, and it is expected that it will be in condition to commence manufacturing early next month.

ARTHUR E. FRISWELL.

ARTHUR E. FRISWELL, tire expert, was born in Coventry, England, in 1870. He was brought to this country at the age of 14 by his father, the late E. D. Friswell, who became a



A. E. FRISWELL.

partner in the Bridgeport Elastic Web Co., Bridgeport, Connecticut. After a term of school in Bridgeport he went to the Revere Rubber Co., Boston, Massachusetts, working under the late James Leigh. He worked there for eight years during which period the pneumatic tire came into existence. After becoming foreman of the Revere Rubber Co.'s first tire department he assumed charge of the tire department of the Mechanical Fabric Co.,

Providence, Rhode Island, which was then an offshoot of the firm of David Moseley & Sons, Limited, Manchester, England, making thread for the Bridgeport Elastic Web Co., and tires for the Dunlop company in America. Mr. Friswell spent a further eight years building up the tire department of the Mechanical Fabric Co. Then that department became merged in the Rubber Goods Manufacturing Co. and was shifted to Hartford, Connecticut, where he went as assistant superintendent of the Hartford Rubber Works Co. During four years there Mr. Friswell saw the pneumatic bicycle tire begin to expand into the motor tire, and contributed towards its success.

Deciding that a bit of the world not bounded by rubber and with latitude and longitude not defined by the pneumatic tire might enlarge his horizon, he started for a world tour with letters of introduction to all the leading tire makers in Europe, and some of the then infant plantations; but he did not get very far. His technical knowledge was wanted by Messrs. Moseley, in Manchester, England, and they got it. For almost four years he, as manager of the tire department, fought an up-hill battle in a country of free imports against all comers, foreign and domestic.

His father's death compelled his return to America where, for a time, he was soon engaged by the Goodyear Tire & Rubber Co., Akron, Ohio. Feeling entitled to a rest, Mr. Friswell then took it on his bungalow estate in Bermuda, where his wife was born. But, as he says, a man's work is part of the fabric of his life. He has, therefore, been back to England for two years, doing special work in rubber, and now, that work being finished, he is again in America with an important tire connection.

BRIGHT PROSPECTS FOR SEBRING TIRE COMPANY.

At a special meeting of stockholders of the Sebring Tire & Rubber Co., Sebring, Ohio, held May 10, it was voted to increase the capital stock from \$200,000 to \$500,000, and a stock dividend of 25 per cent. to present stockholders was declared. Bright prospects were reported and the production is to be immediately increased to 200 tires per day. E. H. Trump, maker of the original "Quality Tire" at Hartville, Ohio, is the practical man in the concern and J. S. Hotchkiss is general manager.

PERSONAL MENTION.

J. Wilbur Hobbs has been placed in charge of the New York City branch of the Lee Tire & Rubber Co., Conshohocken, Pennsylvania, which has been moved from 1966 Broadway to 236 West Fifty-fourth street.

L. W. Kennedy has been appointed special truck tire representative for the United States Rubber Co., in the Southern district, with headquarters at Atlanta, Georgia.

Fred L. Gayton, formerly with the Goodyear Tire & Rubber Co., has now joined the New York City forces of the United States Rubber Co.

Theodore F. MacManus, of Detroit, Michigan, has been retained by the Republic Rubber Co., Youngstown, Ohio, as advertising and business counsel for the extensive advertising campaign of the company's Prodim Process tires.

Herman Ditt, formerly of Detroit, Michigan, has been appointed superintendent of the Lion Tire & Rubber Co., Lafayette, Indiana.

J. R. Cheshire succeeds R. J. Murphy as manager of the Atlanta, Georgia, branch of The B. F. Goodrich Co., Mr. Murphy having entered the automobile business as distributor for Oakland motor cars.

George A. Richards has been appointed special representative for the manufacturers' sales department of the Firestone Tire & Rubber Co. in the Detroit, Michigan, territory. Mr. Richards has been connected with the sales department of the company for several years, during the past three years occupying positions as branch manager at Columbus, Ohio, and Pittsburgh, Pennsylvania.

S. A. E. SUMMER MEETING.

Plans for the summer meeting of the Society of Automotive Engineers to be held at the Bureau of Standards in Washington, D. C., June 25-26, are now fully completed. On Tuesday war airplanes will be considered. Wing Commander I. W. Sedden, R. N. A. S., and Major Reese, of the British Commission in this country, will read papers and answer questions on this subject. Motor trucks, farm tractors and motor boats will be considered by men prominent in these branches. A professional session will be held at the Bureau of Standards and the various departments of the Bureau will be open to inspection of the members on Monday, the 25th, when special demonstrations of testing materials, etc., will be shown. An informal dinner will be held at the New Willard Hotel Tuesday evening, June 26, at which Secretary of War Newton Baker will make the principal address, and there will be other speakers. Over 30 guests representing the Army and Navy will be present, in addition to the Council of National Defense and other organizations now cooperating with the Government. It is expected that more than 800 members will attend this meeting and dinner. At the last meeting of the council 227 new members were admitted.

THE GOODYEAR TIRE & RUBBER CO. PROMOTIONS.

C. M. McCreery, formerly assistant manager of the Chicago, Illinois, district, has been made special manufacturers' representative for the same district, G. H. Barmore being transferred from Milwaukee, Wisconsin, to fill the vacancy. A. J. Sears, formerly branch manager at Sioux City, Iowa, succeeds Mr. Barmore as branch manager at Milwaukee, and W. A. Ziegler, formerly city salesman at Milwaukee, has been made branch manager at Sioux City.

W. S. Boone, formerly supervisor of city sales in Philadelphia, Pennsylvania, is now special manufacturers' representative for the New York district.

NEW INCORPORATIONS.

Akron Equipment Co., The, March 28 (Ohio), \$125,000. The officers of the company with the exception of C. D. Quine, general manager, are only temporary. Temporary location, 923-27 South High street, Akron, Ohio. To manufacture tire molds and tire repair equipment.

American Detachable Rubber Heel Corp., May 16 (Delaware), \$1,000,000. Herbert E. Latter, C. L. Rimlinger—both of Wilmington, Delaware, and Clement M. Egner, Elkton, Maryland. The office of the corporation within the State of Delaware is with the Corporation Trust Co. of America, 486 Dupont Building, Wilmington, Delaware. To manufacture, buy, sell and deal in leather and leather goods, rubber and rubber goods of every kind.

American Nipple Co., May 16 (New Jersey), \$100,000. Charles B. Hermans, Aloysius McMahon, and James J. McCabe, all of No. 1 Montgomery street, Jersey City, New Jersey. Principal office at the above address. To manufacture, purchase and sell rubber nipples, rubber sundries and all goods of which rubber is a component part, etc.

Auto Vulcanizer & Specialty Co., April 26 (Delaware), \$50,000. Wilber A. McCoy, Pittsburgh, Pennsylvania; W. I. N. Lofland, and Charles H. Jones—both of Dover, Delaware. The office of the corporation within the State of Delaware is with the Capital Trust Co. of Delaware, Dover, Delaware. To manufacture and sell the Automatic Steam Vulcanizer for vulcanizing rubber tires, and to deal in automobile accessories of all kinds.

Bachem-Robinson Co., Inc., The, March 15 (Michigan), \$30,000. Maxmillian Bachem (president and general manager), 1117 Woodward avenue; Weldon Robinson (secretary and treasurer), 54 Edison avenue—both in Detroit, Michigan. Principal office in Detroit, Michigan. To manufacture and deal in equipment for automobiles, airplanes, motor-cycles, etc.

Barnett S., Inc., April 5 (New Jersey), \$3,000. Samuel Barnett, 407 Bloomfield street, Hoboken, New Jersey; Louis Barnett, 1355 Sixtieth street, Brooklyn, New York; Jacob Barnett, of the same address. Principal office at 407 Bloomfield street, Hoboken, New Jersey. To sell, purchase and deal in all kinds of old and new metals, rubber of every description and kind, etc.

Carlisle Cord Tire Co., Inc., May 7 (New York), \$550,000. Frank R. Serles, East Orange, George F. Hadel, Montclair—both in New Jersey; Henry G. Wenzel, Jr., Woodhaven, New York. To manufacture automobile tires, etc.

Chinnock Tire & Rubber Corp., The, May 5 (Delaware), \$250,000. Cornelius A. Cole, Hackensack, New Jersey; Arthur R. Oakley, Pearl River, Paul E. Britsch, 1528 Bedford avenue, Brooklyn—both in New York. The office of the corporation within the State of Delaware is with the Registrar & Transfer Co., 900 Market street, Wilmington, Delaware. To manufacture and generally deal in tires for automobiles, bicycles, carriages and vehicles of all kinds.

Constable Tire & Rubber Co., May 17 (New York), \$100,000. George J. Constable, 1805 Avenue J., Robert S. Hoffman, 2023 Caton avenue, and Henri Pressprich, 256 Seventy-ninth street—all in Brooklyn, New York. Dealers in auto tires, tubes and accessories.

Diamond Rubber Co., Inc., The, April 25 (New York), \$200,000. H. E. Raymond and Norman E. Oliver—both of 1780 Broadway, New York City, and Frank C. Van Cleef, Main street, Akron, Ohio. Principal office at 1780 Broadway, New York City. To sell rubber goods for the most part consisting of "Diamond Brands," manufactured by The B. F. Goodrich Co., Akron, Ohio.

Dominion Asbestos & Rubber Corp., May 10 (New York), \$20,000. Allen E. Moore, 20 Arden street, George F. Jebbett, 120 Sherman avenue—both in New York City; F. H. Butehorn, 764 St. Johns Place, Brooklyn, New York. Packing, rubber, asbestos, and insulating materials.

Double Action Tire Pump Co., April 13 (Virginia), \$50,000. J. B. Ford (president), R. G. Leftwich (vice-president), A. T. Henderson (secretary and treasurer), J. B. Ford, J. B. Bowles, R. D. Hughes, R. G. Leftwich, A. T. Henderson (directors)—all of Lynchburg, Virginia. To manufacture pumps, machinery, etc.

Dunlop Rubber Co., Inc., May 22 (New York), \$1,000. Otto Braunwarth, L. A. Braunwarth and Albert Braunwarth—all of 1808 Broadway, New York City. To manufacture tires, etc.

Dunn, John H., Tire Co., March 30 (Texas), \$10,000. John H. Dunn, A. M. Rhodes, and Will E. Looney—all of Dallas, Texas. To sell goods, wares and merchandise, particularly automobile tires and accessories.

Flexenham Insulating Co., Inc., May 19 (New York), \$250,000. Judson Lawrence, Geo. E. Packard and Edgar T. Chapman—all of Albany, New York.

Hoover Tire Carrier Corp., April 24 (Delaware), \$200,000. M. L. Gatchell, L. A. Irwin, and Harry W. Davis—all of Wilmington, Delaware. The office of the corporation within the State of Delaware is with the Delaware Registration Trust Co., 500 Market street, Wilmington, Delaware. To manufacture any and all kinds of generators, motors, engines and other machinery.

Hoover Tire Carrier Corp. of New York, May 2 (New York), \$10,000. Arthur D. Hayden, 121 East Twenty-first street, Hiram Barney, 55 West Forty-fourth street, and Don C. Bartholomew, 895 West End avenue, all of New York City. General manufacturing business.

Ideal Tire & Rubber Co., The, April 25 (Ohio), \$1,000,000. Eli Cannell (president), I. R. Davies (treasurer), A. S. Davies (secretary), B. E. Frantz (superintendent), Geo. H. Burrows, E. Scott Cannell, A. Klohs and C. B. Hurd (directors). Principal office, 326 Guardian Building, Cleveland, Ohio. To manufacture tires and tubes.

Loughman, Thomas, Inc., May 4 (New York), \$10,000. Thomas Loughman (president and treasurer), 530 West End avenue, A. E. Beckert (secretary), 468 Riverside Drive—both in New York City. Principal office 1791 Broadway, New York City. Distributors of Dreadnaught automobile tires and tubes.

Loewenthal & Co., R. M., May 14 (New York), \$200,000. R. M. Loewenthal, 260 Riverside Drive; J. M. Detjen, 61 Broadway—both in New York City, and R. D. Ottignon, 261 Greene avenue, Brooklyn, New York. Principal office is at 51 East Forty-second street, New York City. Dealers in rubber, metals, etc.

Manufacturers Surplus Tire Co., Inc., May 5 (New York), \$500. Adolph Bangser, Joseph T. Mulligan and Louise Stern—all at 55 Liberty street, New City. To manufacture auto accessories, etc.

Michigan Tire & Accessories Co., March 27 (Michigan), \$100,000. F. W. Kehlet (president and manager), E. F. Roberts (vice-president), and F. J. Goders (secretary and treasurer). Principal office is at 218 Michigan street, N. W., Grand Rapids, Michigan. Jobbers of automobile accessories and tires.

Miller, Robert E., Inc., May 17 (New York), \$200,000. Harry Taffer, Harry A. Rosenberg and Florence R. Nordenschild—all of 19 Cedar street, New York City. To manufacture rubber heels, rubber boots and shoes.

Montford Rubber Co., Inc., April 20 (New York), \$50,000. H. T. Auerbach, Statler Building, H. A. Forbes, 241 Maryland street, and L. B. Dietz, 40 Laurel street—all in Buffalo, New York. To manufacture rubber products.

National Conduit & Cable Co., Inc., April 25 (New York), \$750,000. J. W. Rhoades, 530 West One Hundred and Thirteenth street, New York City; Percy S. Williams, 539 Seventy-third street, and Thomas M. Malone, 404½ Henry street—both in Brooklyn, New York. Principal office, Hastings-on-Hudson, New York. To manufacture wires, cables, insulating materials, etc.

O'Sullivan Rubber Co., Inc., April 30 (New York), \$200,000. Charles A. Corliss, Robert H. Cory—both of Englewood, New Jersey, and William P. Tuttle, 420 Riverside Drive, New York City. Principal office 131 Hudson street, New York City. To manufacture rubber heels, belting and rubber goods, etc.

Overland Tire Co., Inc., April 9 (New Jersey), \$100,000. James A. Whitman, 86 Crescent avenue, Grantwood, New Jersey, John D. Olwell, 236 West Forty-sixth street, and Robert L. Noah, 200 West Ninety-fourth street—both in New York City. Principal office, 15-25 River street, Newark, New Jersey. To manufacture, purchase or otherwise acquire, deal in and sell rubber automobile tires of every kind and description, and other rubber goods used for any other purposes of trade and commerce; to manufacture any and all kinds of machinery as well as appliances and accessories used in the manufacture of rubber automobile tires and rubber goods of every kind, nature and description.

Palmer Tire & Rubber Co., November 28 (Michigan), \$500,000. John F. Palmer (president), Riverside, Illinois; George W. Bulley (vice-president), Marshall D. Wilber (treasurer), W. E. Bryan (secretary)—all of Chicago, Illinois. Principal office, 7 West Tenth street, Wilmington, Delaware. To manufacture rubber, particularly pneumatic tires and tubes and solid rubber tires for any and all kinds of wheeled vehicles, and the sale thereof.

Peters Brothers Rubber Co., Inc., May 2 (New York), \$100,000. William F. Peters and Geo. L. Peters, both of 431 Riverside Drive, and William F. Peters, Jr., 644 Riverside Drive—both in New York City. Principal office, 461-479 Eighth avenue, New York City. To manufacture rubber and gutta percha products and adhesive products generally.

Rex-Hide Rubber Mfg. Co., April 20 (Pennsylvania), \$650,000. N. E. Graham (president), George E. Henry (vice-president), F. L. Ludwick (treasurer), C. A. Russ (secretary), Arthur B. Kempel (general manager), M. N. Davis (sales manager)—all of East Brady, Pennsylvania. Principal office, East Brady, Pennsylvania. To manufacture and specialize in fiber soles.

Ross Vulcanizing & Battery Co., Inc., May 24 (New York), \$10,000. Harry M. Swartz, 1015 Lake Street, Leslie W. Jennison and Thomas M. Losie, both 1240 West Water street, all of Elmira, New York. Tire and battery service station.

Safety Sub-Cushion Automobile Tire Co., April 28 (Missouri), \$5,000. C. E. Robinson, G. W. Young, G. H. Sanford, W. B. Sanford and J. B. F. Showlter. Principal office, Springfield, Missouri. To manufacture and sell certain patent sub-cushion automobile tires and to deal in automobile supplies.

Service Tire & Rubber Co., Inc., May 4 (New York), \$1,000. Sydney Bernheim, 35 Nassau street, New York City; C. A. Weldon, 591 Seventh street, and H. H. Jacobson, 555 Grand street—both in Brooklyn, New York. To manufacture tires for autos, etc.

Sherman-Stiveson Tire & Rubber Co., April 27 (Delaware), \$500,000. Wilber A. McCoy, Pittsburgh, Pennsylvania; W. I. N. Lofland, and Charles H. Jones—both of Dover, Delaware. The office of the corporation within the State of Delaware is with the Capital Trust Co. of Delaware, Dover, Delaware. To manufacture, buy, sell and deal in rubber tires for automobiles, motor trucks and other motor driven vehicles, and automobile accessories of every kind and description.

Star Distributing Corp., May 1 (New York), \$1,000. George Norris, George H. Massey and K. Healy—all of 115 Broadway, New York City. To manufacture tires, rubber goods, etc.

Star Tire Co., Inc., The, May 5 (New York), \$1,000. George Norris, George H. Massey and K. Healy—all of 115 Broadway, New York City. To manufacture tires and rubber goods.

Sterling Mills, Inc., April 16 (Rhode Island), \$75,000. Richard B. Chace, Leonard S. Chace—both of Fall River, Massachusetts, and J. Richard Fales, Pawtucket, Rhode Island. To buy, sell, manufacture, dye, bleach, mercerize, etc., yarns, cloths, etc., of all kinds. Principal office, Central Falls, Rhode Island.

Tacoma Tire Service Co., March 2 (Washington), \$7,500. F.

T. Carleton (president and manager), Tacoma, Washington; W. M. Maloney (vice-president and treasurer), and F. C. Sheraton (secretary)—both of Everett, Washington. Principal office, Tacoma, Washington. To handle Firestone solid and pneumatic tires, with vulcanizing shop in connection.

United Guarantee Tire Co., May 15 (New Jersey), \$100,000. Samuel H. Levy, Louis Herman, and Mayer Krasner—all of Newark, New Jersey. Principal office, 800 Broad street, Newark, New Jersey. To buy and sell automobile tires, tubes, rims and like articles; to manufacture, prepare, deal in and deal with, purchase and sell, all kinds of tires, tire rims, tire tubes and like articles, and automobile accessories of every kind and description, etc.

Wearwell Rubber Co., May 5 (New Jersey), \$60,500. Isidore L. Broadwain, 736 Riverside Drive, New York City; Cassiel A. Kavner, 274 High street, Passaic, New Jersey, and Herman Mendes, 460 Linwood avenue, Brooklyn, New York. Principal office, Schley, Cherry, Dewey and Walnut streets, Garfield, Bergen County, New Jersey. To manufacture, produce, buy, sell, export, import and generally deal in rubber and gutta percha and all goods of which rubber and gutta percha are component parts and the various materials entering into the manufacture of any and all such goods.

FARREL FOUNDRY & MACHINE CO. EXTENDS FACILITIES.

The new erecting shop of the Farrel Foundry & Machine Co., Ansonia, Connecticut, shown in the accompanying illustration, will be used to set up machinery to advantage before shipment. The building is of steel-brick construction, 120 by 400 feet, with a concrete floor throughout. The roof has a sawtooth skylight



FARREL FOUNDRY & MACHINE CO., ANSONIA, CONN.

top of monolithic construction, and all equipment is of the most modern design. A bridge of 40 tons' capacity, equipped with an electric transfer car, connects the new building with the machine shop, the material being unloaded by an electric crane directly from the bridge car to the erecting floor, by means of a 25-ton transfer crane, and the erecting floor being served by four 15-ton electric cranes so placed as to give a head room of 21 feet. A side track of the New York, New Haven & Hartford Railroad enters one end of the building and four cars can be loaded at a time from the loading platform.

The Farrel company is now working on a new extension of its roll shop, which is a building of brick-steel construction, 108 by 103 feet, to be devoted to the machining and finishing of rolls. This building is of modern construction, with steel sash, flat roof, and a skylight of suitable proportions to insure proper light and ventilation. The machine tools designed for this work will be installed in the building and they will be served by one 5-ton and two 30-ton electric cranes.

The Rubber Association of America.

THE Rubber Association of America, Inc., has been particularly active the past month, and a gratifying increase in membership is noted. Perhaps the most important work was that of the Legislative Committee at a hearing before the Senate Finance Committee at Washington, when an amendment was proposed to the war tax legislation now pending. The suggested amendment and the argument are given below in full. A verdict in favor of the Association has been rendered in the Blitz case. The Foreign Trade Division has elected officers and chosen committees. A Tire Manufacturers' Division has been organized. The Arbitration Committee is planning for practical work. A war clause has been adopted to apply to orders and contracts, and the Enlistment Committee is actively engaged in the work for which it is appointed. The details of these proceedings and activities are given below.

THE LEGISLATIVE COMMITTEE AND THE WAR TAX.

On May 5 the Legislative Committee of The Rubber Association of America, Inc., together with Martin W. Littleton, special counsel, appeared before the Senate Finance Committee at Washington, D. C., in opposition to the proposed tax on crude rubber. The suggested amendment and the memorandum brief that were filed with the Committee to supplement the oral arguments are as follows:

Suggested amendment by which the rubber industry will be made to yield \$30,000,000 in taxes annually.

SECTION 600. TAX ON MANUFACTURED RUBBER ARTICLES.

Section 600. That there shall be levied, assessed, collected and paid:

(a) Upon all manufactured rubber articles containing in whole or in part crude rubber or reclaimed rubber sold by the manufacturer, producer or importer, a tax of 5 per centum of the price for which so sold; provided, that in cases where there are contracts in existence for the delivery of such manufactured articles at the time this act becomes a law, the manufacturer, producer or importer shall add to the price for which such article is contracted to be sold, 5 per centum of such contract price, and shall collect and make monthly returns of the same as provided for in Section 601 of this Act; provided further, that no such tax shall be levied, assessed or collected upon manufactured rubber articles destined for exportation.

MEMORANDUM BRIEF.

In the matter of the consideration of House Bill 4,280, with particular reference to title 6, section 600, and also with reference to title 10, section 1,000.

POINT I.—By the provisions of Section 1,000 it is proposed that a tax of 10 per cent ad valorem shall be collected upon all articles not now dutiable by law.

By the provisions of Section 600 of the bill, it is proposed to levy and collect a tax upon all automobiles, motorcycle or bicycle tires sold by the manufacturer, producer or importer equivalent to 5 per cent of the price for which so sold. Crude rubber not now being dutiable by law, will be subjected to a 10 per cent ad valorem tax, when imported, and as 60 per cent of the crude rubber imported goes into automobile, motorcycle or bicycle tires, that per cent will be again subjected to a tax upon the manufactured article of 5 per cent when sold by the manufacturer, producer or importer. This emphasizes a classical example of double taxation upon 60 per cent of the rubber used in the rubber industry.

POINT II.—By the provisions of Section 1,000 of the House Bill which makes dutiable every imported article now upon the free list, the comprehensive and well balanced scheme for the raising of war revenue is totally deranged. The scheme of the bill, manifest from its text and revealed in the debates, was the imposition of a consumption tax and the imposition of income and excess profit taxes as a sure and equitable method of raising the desired revenue. By this method \$1,600,000,000 was provided for without interfering with existing tariff rates and without disturbing the well considered free list. In order to raise an additional \$200,000,000 of revenue the entire group of tariff schedules, along with the multiplied items of the free list, are incorporated into the bill in Section 1,000, and a 10 per cent

additional ad valorem tax fixed upon articles now dutiable by law and a like 10 per cent upon articles not now dutiable by law. The unwisdom, inequality and unscientific character of this levy of customs duty is frankly and forcibly recognized in the report of Mr. Kitchin from the Committee on Ways and Means, in which it is said: "Your committee realizes that this tax is neither scientifically nor equitably adjusted, and recommends the same only as a war tax." It has long been the hope of eminent economists and public men that the time would arrive in this country when the revenues of the Government could be increased or diminished, as occasion required, without disturbing or upsetting the industries of the country, and if the scheme of this bill, which was designed to impose a tax at the point of consumption, a tax at the point of the collection of income, and at the point of the gathering in of the excess profits, had been adhered to, while there would have been an additional burden to have been borne, it would not have precipitated a disturbance at the very roots of all industry in the country by laying an initial tax upon all non-dutiable importations and an additional tax upon all dutiable importations. The committee has only to consider a few items now made dutiable by Section 1,000 to ascertain the far reaching effect of this proposed levy. The bagging for cotton, copper ore, the fertilizer material, the hides of cattle, the lumber and the wool, and the silk and the rubber. These indicate the extent to which the tariff question is involved in this legislation. Surely if the Ways and Means Committee were able to provide for \$1,600,000,000 of revenue without disturbing the tariff schedules and without burdening the free list, it ought not to be difficult, by a further extension of the excise and excess profit tax, to provide this additional \$200,000,000 and avoid the recognized inequalities of the customs levy provided by Section 1,000.

POINT III.—A tax of 10 per cent upon importations of crude rubber is the one tax which is most hurtful to the industry and least fruitful of revenue, hurtful to the industry because of the tendency it would have in curtailing importations. The market price of first grade plantation rubber in London to-day is 37d. or figured with exchange at \$4.76½, equals .7346 per pound. Charges to New York are to-day approximately 7 cents per pound, which makes the rubber purchased in London cost 80 cents when landed here. Adding 10 per cent, the rubber would cost, with the proposed duty, 88 cents, which is a high figure when it is considered that the average for this grade of rubber in 1915 was 65½ cents, and in 1916, 73 cents. In normal times manufacturers, on an average, carried about three months' supply of rubber at the mills. To-day this reserve is cut to about one month. The natural fear which arises from the proposal to tax crude rubber is that at 88 cents per pound, manufacturers will be inclined to take chances and will decline to increase their stocks to a three months' basis, which it is believed in the industry is essential to safety. Most of the rubber produced in the world comes from the Federated Malay States and from Brazil. The former country imposes an export tax of 7½ per cent, the latter of about 23 per cent. The policy of the British Government, for economic reasons, is to divert as much of the British-grown rubber as possible to London to be re-distributed from that point. No export tax has as yet been placed by Great Britain on shipments from the British Isles, but if, as a revenue measure, the British Government should impose an export tax, which is a strong probability, the economic position of America would be possibly untenable. The rubber stock in the United States at present presented in the day's supply is as follows:

Stocks on hand at mills March 31, 1917.....	30 days
Stocks in transit actually in United States.....	17 days
Stocks for which permits have been issued but which have not yet arrived in the U. S.....	29 days
Total in U. S. and permitted.....	76 days

Another advantage of decided importance in having an excise upon the manufactured article as against a customs levy on the imported crude article is that such excise tax would not be imposed upon manufactured rubber articles destined for exportation, and hence the industry would be able to contend in the markets of the world with its competitors, without the burden of this tax, whereas a tax upon importations of crude rubber would fix an initial burden and create a continuing disadvantage which would accompany the article through all of its forms of manufacturing and into the channels of exportation.

Summarizing the matter as briefly as possible, it is submitted:
First. That the tariff duties imposed by Section 1,000 of the House bill have no logic or just place in the scheme of taxation proposed, and should be entirely eliminated from the bill.

Second. That tariff duties upon raw material are wholly inimical to the welfare of American industry and impose a burden upon the manufacturing agencies of this country at a time when the whole nation stands in need of their greatest strength and support.

Third. The levy of a tariff duty upon crude rubber, an article of such vital necessity wholly produced outside of the United States, will have a strong tendency to curtail importations, and thus produce a shortage of crude rubber in the United States.

Fourth. The excise tax imposed by Section 600 of the House bill upon automobile, motorcycle and bicycle tires of 5 per centum of the price at which these tires are sold by the producer, manufacturer or importer, while just in itself and the subject of no complaint standing alone, is as the bill is drawn tantamount to double taxation.

Fifth. The Ways and Means Committee, having provided successfully for \$1,600,000,000 of revenue by means of income, excess profits and consumption taxes, the Congress is not warranted in taking up and dealing with the tariff upon importations of all kinds in order to raise the balance of \$200,000,000 of revenue, especially when this revenue could in large measure be provided for by a further extension of the excise and excess profits taxes.

Respectfully submitted,

LEGISLATIVE COMMITTEE,
FREDERIC C. HOOD, Chairman;
H. STUART HOTCHKISS,
GEORGE B. HODGMAN,
FRANK A. SEIBERLING,
HARVEY S. FIRESTONE, Ex-officio;
HARRY S. VORHIS, Secretary.

ASSOCIATION WINS PLEA FOR CRUDE RUBBER

The decision in the case of Ludwig Blitz v. The Rubber Control Committee, by which a verdict was returned for the defendant, is a most important victory for the American rubber trade, as it has resulted in a complete vindication of the acts of The Rubber Association of America.

This suit was brought in the fall of 1915, the plaintiff alleging his crude rubber business was ruined by the defendant to the extent of \$100,000. The testimony of Sir Francis Hapwood, Lord of the British Admiralty, and Sir Nathaniel Highmore, Secretary of the War Trade Department, being taken last winter in London. The testimony of Sir Richard Crawford, K.C.M.G., Commercial Advisor of the British Embassy, was taken in Washington, D. C. The jury trial was heard by Supreme Court Justice Cropsey, in Brooklyn, May 14-19. In summing up his charge to the jury, the Judge said: "That the only point for you to decide is the exceedingly simple one of whether or not these men (the defendants) have wrongfully, unlawfully or wilfully conspired together to injure the plaintiff." After being out about a half hour, the jury returned a verdict for the defendants.

Attorneys for the defendants were Charles Neave, Herbert Smyth and Sidney S. Meyer. For the plaintiff, Francis I. Tierney.

NEW MEMBERS

At the meeting of the Executive Committee, May 14, the following firm and associate members were elected:

FROM MEMBERS

C. H. Wright, Racine Auto Tire Co., Racine, Wisconsin.
Yuk. Nagasawa, Mitsui Bussan Kaisha, Ltd., Yokohama, Japan.
James Meade, Meade Rubber Co., Stoughton, Massachusetts.
H. M. Dannebaum, The Schwarzwaelder Co., Philadelphia, Pennsylvania.
Jesse D. Galt, The Galt Tire Co., Akron, Ohio.
A. E. Gordon, Gryphon Rubber Tire Corp., New York City.
William A. Sweet, Hardman Tire & Rubber Co., New York City.
Robert D. Landrum, The Harshaw, Fuller & Goodwin Co., Columbus, Ohio.
H. L. Green, The G. Mathes Co., New York City.
L. H. Firey, The Star Rubber Co., Akron, Ohio.
LeRoy Clark, The Safety Insulated Wire & Cable Co., New York City.
B. C. Tunison, The East Palestine Rubber Co., Pittsburgh, Pennsylvania.
Chas. G. Gates or John G. Gates, Colorado Tire & Leather Co., Denver, Colorado.
Joseph Chalfire or A. Boardman, Joseph Chalfire, New York City.
Ed. C. Griffith, H. A. Demarest or K. G. Johnston, Beacon Tire Co., New York City.
B. Reysnider, Aluminum Flake Co., Akron, Ohio.

W. O'Neil, The General Tire & Rubber Co., Akron, Ohio.
L. F. Smith, The Amazon Tire & Rubber Co., Akron, Ohio.
Henry L. Houk, The American Rubber & Tire Co., Akron, Ohio.

TRANSFERRED FROM ASSOCIATE TO FROM MEMBERSHIP

Warren MacPherson, Cambridge Rubber Co., Cambridge, Massachusetts.
Paul Loewenthal, The Loewenthal Co., Brooklyn, New York.
R. M. Loewenthal, R. M. Loewenthal Co., New York City.
Calvert B. Archer, Archer-Strauss Rubber Co., Framingham, Massachusetts.

ASSOCIATE MEMBER.

William O. Cutter, United States Rubber Co., New York City.

NATIONAL INDUSTRIAL CONFERENCE.

Van H. Cartmell, president of the Kelly-Springfield Tire Co., New York City, was delegated to represent the Rubber Association at the meetings of the National Industrial Conference to be held at Boston, Massachusetts. Frederic C. Hood, Hood Rubber Co., Watertown, Massachusetts, was delegated to serve as the other member.

ANNUAL OUTING MAY BE HELD

Due to the war and the consequent activities of the rubber trade in more serious matters, the Outing Committee has recommended that the Annual Outing should be abandoned this year and the money, usually subscribed for that purpose, be contributed to the Red Cross or some equally worthy cause.

WAR CLAUSE FOR ORDERS AND CONTRACTS.

The Rubber Sundries Manufacturers' Division and the Mechanical Rubber Goods Manufacturers' Division have adopted the following war clause to apply on orders and contracts:

Due to present extraordinary conditions in this country it is understood and agreed that if, during any period of this contract or order, the seller makes a general reduction in his prices for the merchandise described herein, it will give the purchaser the benefit of such reduction of prices on any unfilled portion of said contract or order. Likewise, if the cost of manufacture of said merchandise increases, it is further understood and agreed that the seller shall have the right to notify the purchaser of advances in prices on all unfilled portions of the contract or order, whereupon the purchaser shall promptly notify the seller either of the acceptance of said advance in prices or the balance of the contract or order shall thereupon be cancelled.

It is agreed that the order is accepted on the understanding that delivery be made at or as near the time specified as manufacturing conditions will permit.

All prices are subject to any import duties or revenue taxes which may be imposed and which shall be for the account of the buyer.

CRUDE RUBBER SALES CONDITIONS.

The rules and regulations adopted by The Rubber Association of America, Inc., to govern transactions between buyers and sellers of crude rubber have been published in pamphlet form and distributed to the members. These rules and regulations follow very closely the draft published in THE INDIA RUBBER WORLD (February 1, 1917, page 256), one or two unimportant changes being made in several sections. Rule 3, however, is materially changed and now reads as follows:

3. Where a parcel of rubber is sold with a description of quality inferior to that specified in Rule 1, Section A, and upon delivery is found inferior to the description in whole or in part, then the buyer must accept the same with allowance, provided such allowance is in the opinion of the arbitrators, be not more than two cents per pound on the inferior portion; but should the allowance be more than two cents per pound the parcel in whole or in part may be rejected and the seller may substitute proper quality to fulfil his contract at the original point of delivery in the United States of America or Canada or at the Port of New York within ten days from the time of rejection or within the time for delivery as the case may be. In case the seller does not replace, the buyer at his option may cancel the contract, or buy and charge the difference, if any, to the seller.

ENLISTMENT COMMITTEE FOR NEW YORK.

One of the most practical and important committees of the Rubber Association is that on Enlistments in the National Guard of the State of New York, consisting of W. G. Ryckman, W. G. Ryckman Co., Inc., New York City, chairman; Amedee Spadone, Gutta Percha & Rubber Manufacturing Co., New

York City; R. C. Fisher, United States Rubber Co., New York City.

The day of their appointment they began an energetic canvass right at home in New York State to help secure the New York quota of 10,000 men requested by Governor Whitman for the New York National Guard. As we go to press they are extending their work to all sections where the rubber trade is represented.

FOREIGN TRADE DIVISION ELECTION.

At the meeting of the Foreign Trade Division held May 1, 1917, the following officers were elected: E. H. Huxley, United States Rubber Export Co., Limited, New York City, chairman; C. O. Brandes, Firestone Tire & Rubber Co., Akron, Ohio, vice-chairman; H. S. Vorhis, The Rubber Association of America, Inc., secretary and treasurer. The following were elected members of the Executive Committee:

Henry G. Tyer, Tyer Rubber Co., Andover, Massachusetts.
William B. Loughton, Hood Rubber Co., Watertown, Massachusetts.
R. J. Owens, Boston Woven Hose & Rubber Co., Cambridgeport, Massachusetts.
A. S. Hardy, Manhattan Rubber Manufacturing Co., Passaic, New Jersey.
P. G. Smith, Goodyear Tire & Rubber Co., Akron, Ohio.

The following is a list of the members of the Foreign Trade Division and the companies they represent.

D. Bardin, Michelin Tire Co., Milltown, New Jersey.
H. D. Benner, Federal Rubber Co., 38 West Sixty-second street, New York City.
W. P. Berrien, Batavia Rubber Co., Batavia, New York.
Herbert W. Bixler, Republic Rubber Co., 149 Broadway, New York City.
E. E. Bloom, Endurance Tire & Rubber Co., 17 Battery Place, New York City.
Harry Braender, Braender Rubber & Tire Co., 250 West Fifty-fourth street, New York City.
C. O. Brandes, Firestone Tire & Rubber Co., Akron, Ohio.
H. H. Burtis, Lovell Manufacturing Co., 86 Warren street, New York City.
G. C. Chalmers, Hodgman Rubber Co., Tuckahoe, New York.
H. H. Coleman, Delion Tire & Rubber Co., Trenton, New Jersey.
E. A. Craver, A. J. Bates & Co., 176 Duane street, New York City.
F. E. Dayton, Ajax Rubber Co., Inc., 1708 Broadway, New York City.
H. W. Dupuy, Pennsylvania Rubber Co., Jeannette, Pennsylvania.
P. L. Fellingner, Gordon Tire & Rubber Co., 50 Broad street, New York City.
A. A. Garthwaite, Lee Tire & Rubber Co., Conshohocken, Pennsylvania.
J. M. Gibbs, Beacon Falls Rubber Shoe Co., Beacon Falls, Connecticut.
W. E. Greene, Boston Belting Co., 102 Reade street, New York City; Standard Tire & Rubber Manufacturing Co., Cleveland, Ohio.
A. S. Hardy, Manhattan Rubber Manufacturing Co., 120 Broadway, New York City.
Hugo Hoffstaedter, Polack Tyre & Rubber Co., 1876 Broadway, New York City.
E. H. Huxley, United States Rubber Export Co., Limited, 1790 Broadway, New York City.
E. K. Johnson, American Hard Rubber Co., 11 Mercer street, New York City.
Wm. B. Loughton, Hood Rubber Co., Watertown, Massachusetts.
Frank Le F. Lawrence, A. G. Spalding & Bros., 128 Nassau street, New York City.
W. A. Logan, McGraw Tire & Rubber Co., 515 West Fifty-sixth street, New York City.
H. L. McClaren, Racine Rubber Co., Racine, Wisconsin.
Jno. Macfadyean, Goodyear Tire & Rubber Co., Akron, Ohio.
Jno. B. Maus, The Fisk Rubber Co., 11 Broadway, New York City.
I. L. Miller, Faultless Rubber Co., Ashland, Ohio.
Geo. H. Moss, Electric Cable Co., 10 East Forty-third street, New York City.
William Niedner, Chas. Niedner's Sons Co., Malden, Mass.
R. J. Owens, Boston Woven Hose & Rubber Co., 30 Church street, New York City.
H. H. Replogle, Marathon Tire & Rubber Co., Cuyahoga Falls, Ohio.
E. A. Sattler, Howe Rubber Co., New Brunswick, N. J.
S. Towne, Bowers Rubber Works, San Francisco, California.
H. G. Tyer, Tyer Rubber Co., Andover, Massachusetts.
C. E. Wagner, Miller Rubber Co., Akron, Ohio.
Thomas F. Walsh, Swinehart Tire & Rubber Co., Akron, Ohio.

The Executive Committee of the Foreign Trade Division appointed the following committees at the meetings of May 14, 1917:

TIRES.—C. O. Brandes, Firestone Tire & Rubber Co., chairman; F. E. Dayton, Ajax Rubber Co.; John Macfadyean, Goodyear Tire & Rubber Co.; John B. Maus, Fisk Rubber Co.; H. W. Bixler, Republic Rubber Co.

DRUGGISTS' SUNDRIES.—H. G. Tyer, Tyer Rubber Co., chairman; Charles J. Davol, Davol Rubber Co.; G. C. Chalmers, Hodgman Rubber Co.; C. E. Wagner, Miller Rubber Co.

FOOTWEAR.—J. M. Gibbs, Beacon Falls Rubber Shoe Co., chairman; William B. Loughton, Hood Rubber Co.

E. H. Huxley, United States Rubber Export Co., New York City, chairman of the Division, is a member *ex-officio* of all sub-committees.

SHIPMENTS ALLOWED TO SCANDINAVIA, HOLLAND AND DENMARK.

Manufactured and partly manufactured rubber goods may henceforth be shipped by way of Halifax to Scandinavia, Denmark and Holland, notwithstanding the provisions of the Agreements and Guarantees, which call for their movement to those destinations by way of the United Kingdom. Shippers must make applications through their agents in England to the War Trade Department for a license authorizing the export of goods from the United Kingdom.

As soon as the export license has been issued, the Foreign Office will notify the Embassy at Washington by telegraph, and the Embassy will issue a special certificate known as a "License Navicert," which the shipper will have to deliver to the shipping company for attachment to the ship's manifest. The Embassy will at the same time inform the authorities at Halifax of the issue of the License Navicert, advising them of the name of the vessel on which the goods will go forward. The vessel will be met at Halifax by the export license issued by the War Trade Department in London, and this will be handed by the naval authorities to the master of the ship.

A cablegram has been received, which gives details of arrangements decided upon by the British Government, regarding restrictions of importation of rubber manufactures into England, and also regarding direct shipments to Spain and Northern European countries. The message reads:

Interview with Board of Trade confirms that shipments destined for Scandinavian countries will go via Halifax avoiding England. Shipments for Spain by direct steamer will be permitted the exact method of control to be shortly determined on. All goods intended for England leaving factories or ports on through bills of lading prior to May 10 will be admitted without license. Any shipments which may be near but not prior to that date will be admitted by license. Administrative interpretation with the respect to these cases will be reasonable. All products needed for war will be licensed for admission. Government considering rationing tires on proportion last year's imports. Mail all inland railroad bills of lading prior to May 10. Also any shipments between May 10 and June 1. Expect to get all of these passed.

RUBBER GOODS IMPORTS INTO GREAT BRITAIN REQUIRE LICENSE.

The importation of all manufactured rubber goods into Great Britain has been prohibited from May 10, 1917, except under license from the Board of Trade. Exports of these goods from Great Britain, except to British possessions, has also been prohibited.

BRITISH BLACK LIST WITHDRAWN.

The Association has been officially advised by the British Consul General, New York City, under date of May 7, 1917, that the statutory list of firms, commonly known as the "British Black List," in the United States of America, has been withdrawn. The statutory list as published, however, remains in full force and effect in all neutral countries.

PROOFERS DIVISION ELECTS OFFICERS.

The following officers of the Prooform Division were elected at the last meeting:

L. C. Himebaugh, British-American Manufacturing Co., Springdale, Connecticut, chairman; H. M. Dannebaum, the Schwarzwaelder Co., Philadelphia, Pennsylvania, vice-chairman; H. S. Vorhis, secretary and treasurer. Executive Committee: L. C. Himebaugh, chairman; H. M. Dannebaum, J. Sydemann, Plymouth Rubber Co., Canton, Massachusetts; C. B. Archer, Archer-Strauss Rubber Co., Framingham, Massachusetts; T. J. Callahan, Archer Rubber Co., Milford, Massachusetts.

TIRE MANUFACTURERS' DIVISION ORGANIZED.

At the meeting of tire manufacturers held May 18, it was voted that a Tire Manufacturers' Division of The Rubber Association of America, Inc., should be organized. The object of this division will be to bring the tire manufacturers of the United States together and to perfect an organization that will promote the interests of the members.

THE ARBITRATION COMMITTEE TO PREPARE OFFICIAL LIST.

The Committee on Arbitration is now ready to establish the official list of arbitrators to be composed of men reasonably expert in the following branches of the rubber industry.

Crude rubber importers, dealers, brokers and factory experts; manufacturers of tires—pneumatic and solid; mechanical goods;

boots and shoes; insulated wire and cables; druggists' sundries, surgical goods and specialties; hard rubber goods; clothing and proofers; dental and stamp rubber, stationers' and artists' sundries; sporting goods, golf balls, etc.; dress shields and notions; rubber cement; reclaimed rubber. Manufacturers and dealers in: Rubber substitutes; chemicals; rubber machinery; fabrics; scrap.

Firm members are requested to send to the Secretary names of one or more men, either officials or employees, indicating the particular branch in which they are qualified to act.

The Committee on Arbitration follows:

W. G. Ryckman, W. G. Ryckman Co., Inc., New York City, chairman.
A. H. Brown, Meyer & Brown, New York City.
W. E. Bruyn, L. Littlejohn & Co., Inc., New York City.
W. F. Bass, General Rubber Co., New York City.
Harace De Lissac, Ajax Rubber Co., Inc., New York City.
R. B. Woodbury, Hood Rubber Co., Watertown, Massachusetts.
M. L. Cramer, Michelin Tire Co., Milltown, New Jersey.
H. S. Vorhis, New York City, Secretary.

THE RUBBER TRADE IN AKRON.

By Our Regular Correspondent.

AKRON never lags behind the times in any question affecting industrial activity, and the recent adoption of Eastern time in this city is in accordance with her progressive policies. This change, setting the clocks one hour ahead, allows the working hours to conform most satisfactorily with daylight conditions.

Women workers here are being swept into the emancipating spirit of the war and have adopted a working garb of khaki blouses and bloomers, a sensible and attractive uniform that allows perfect freedom and timely economy.

* * *

At a meeting of The General Tire & Rubber Co. on May 15, the capital stock was increased from \$500,000 to \$1,000,000. The company is working its plant day and night and producing an average of over 380 tires per day. An addition half the size of the original plant has lately been erected, in which a full equipment of machinery is now being installed.

Ten acres of land east of the factory has been donated by the company to its employees for garden plots.

* * *

The Adamson Machine Co. has recently installed equipment for cutting cast iron or steel spur gears up to 6 feet in diameter by 20-inch face.

* * *

The enormous factory of The B. F. Goodrich Co. now has a subway system of its own by means of which rubber-tired electric tractor trains are enabled to transport materials underground from one building to another.

The main line of this traffic tunnel is about 110 feet long and its laterals, or communicating tunnels, measure an additional 600 feet. The tube is of reinforced concrete and brick construction, rectangular in shape, 14 feet wide and 9½ feet high.

The cars employed are so constructed that they may be handled by men in the workrooms as well as by the tractor in the tunnels, and they may be switched off in any factory building. Each building is a receiving and shipping depot on the subway line.

In order to successfully handle the 18,000 calls received at the Goodrich factory, a special telephone system is being installed, which includes a private telephone directory giving the name and 'phone number of most of the employees and the attachment of electric bells which ring in each department when a man is wanted.

The 20,000 employees of the Goodrich company have begun working on eight-hour shifts for the summer months, allowing the workmen opportunity to cultivate the flower and vegetable gardens which they are encouraged to plant in their home yards. The value of this in social economy is self-evident.

Upon the departure of Arthur H. Leavitt, assistant sales manager of the motor truck tire department of the Goodrich company for Fort Sam Houston, Texas, to serve as Captain in the

Quartermaster's Reserve Corps of the United States Army, a handsome sword was presented to him as a token of the regard of his associates. W. O. Rutherford, on behalf of the Operating Committee, made the presentation speech.

* * *

E. W. BeSaw has been selected to fill the newly created position of assistant general sales manager for the Firestone Tire & Rubber Co., H. A. Grubb, Texas manager, succeeding him as western district manager. Mr. BeSaw became connected with the company in 1912, as salesman at the Chicago, Illinois, branch, a year later becoming manager of the branch at Des Moines, Iowa, and on January 1, 1916, receiving the appointment of western district manager, from which he comes to his new position.



E. W. BESAW.

C. H. Sorrick is the newly appointed manufacturers' sales manager, J. D. Hess, Jr., Cleveland branch manager succeeding him as manager of the pneumatic sales department. Mr. Sorrick joined the Firestone forces in 1911, in the carriage tire department, and in 1914 became manager

of the pneumatic sales department. His latest appointment is to fill the vacancy created by the death of Frank C. Blanchard last February.

The Firestone fellowship in Akron University has been won by H. A. Smith, who will specialize in rubber chemistry.

* * *

The Amazon Tire & Rubber Co. will hereafter be known as the Amazon Rubber Co. It has been recapitalized at \$500,000. It manufactures anti-blow-out pneumatic auto tires, and a line of heavy brown inner tubes. The officers remain the same as under the old organization, namely: L. J. Schott, president and secretary; L. F. Smith, vice-president and purchasing agent, and C. E. Bettler, treasurer.



C. H. SORRICK.

The American Rubber & Tire Co. has increased its capital stock to \$1,000,000. Of this amount only \$100,000 is issued at present and it has all been taken by the stockholders. A new addition to the company's plant is under course of construction.

THE RUBBER TRADE IN BOSTON.

By Our Regular Correspondent.

AT the annual election of the Boston Chamber of Commerce, May 15, Everett Morss, president of the Simplex Wire & Cable Co., was one of the seven prominent business men elected to serve three years as directors of the Chamber, and at a meeting of the directors was elected a member of the executive committee. Mr. Morss is a man of large business interests. Besides being president of the above-named company he is a director in the Boston Belting Co., and the Chemical Products Co., vice-president of the Simplex Electric Heating Co., president and director of the Morss & Whyte Co., trustee of the Morss Real Estate Trust, and director of the First National Bank. He is also a member of the corporation, and of the executive committee of the Massachusetts Institute of Technology and a Fellow of the American Institute of Electrical Engineers, and the American Society of Mechanical Engineers. There is an old saying that if you want a thing well done, ask a busy man to do it. Mr. Morss should certainly be able to qualify as a busy man.

... is somewhat tedious to describe the many flag raisings and patriotic doings at the various rubber factories in and around Boston, but the two affairs at the plants of the Boston Rubber Shoe Co. present some variations from the usual program, and are therefore worthy of comment. At the Edgeworth plant a beautiful 20 by 30-foot flag was purchased by the employes. Major Ballard, the assistant treasurer, presided. There was an address by the Mayor of Malden, two women cornetists accompanied, and another woman employe led the singing. They were attired in patriotic costumes. The flag was broken out by the oldest employe, Sherman Lynde, a Civil War veteran, who had just passed his seventy-ninth birthday. When the flag was unfurled confetti and miniature flags dropped upon the company, the latter being eagerly seized as souvenirs of the occasion.

* * *

A similar celebration was held at the "Fells" factory of the company, which was in charge of Assistant Superintendent Lawrence. Here, also, the flag was bought by voluntary contributions of the workers, who also shared with the company in purchasing and erecting the 80-foot flagpole. Mayor Adams, of Melrose, delivered an eloquent patriotic address, and Principal Alexander, of the High School, also addressed the assemblage. When the flag was unfurled, 300 miniature flags fluttered down, and then, led by Mr. Lawrence, all present pledged allegiance to the flag. Singing of the national hymns was under the leadership of Miss Johnson, accompanied by cornetist Miss De Mont, both employes of the company.

The bowling league of the Converse Rubber Shoe Co. held its annual banquet at the Quincy House, in this city, May 12. Addresses were made by Superintendent Bullock and President Marquis M. Converse. Chester Emerson, assistant superintendent, awarded the trophies to the members of the winning team and also individual prizes for high string and high three strings. The "Triple Tread Quartet" (workers in the factory) furnished music for the occasion.

Irving B. Wells, formerly with the Converse Rubber Shoe Co., of Malden, has been appointed manager of footwear sales for New England and the Maritime Provinces for The B. F. Goodrich Co., with offices at the Boylston street headquarters of the company in this city.

The Apsley Rubber Co., Hudson, this state, is extremely busy, with orders for clothing and footwear sufficient to employ all available help. The company is also working on a large contract for ponchos, or similar goods, for the Government.

J. G. Budd, of the export department of the Fisk Rubber Co., Chicopee Falls, Massachusetts, has just returned from a business trip to the Far East. He reports a most encouraging outlook for still further increased business for the company in all sections visited.

* * *

The Consolidated Rubber Co., Cambridge, Massachusetts, has been appointed distributing agent for the Star Rubber Co., Akron, Ohio. The Consolidated company, whose salesrooms are at 167 Massachusetts avenue, will distribute Star tires throughout New England.

* * *

Sales Manager Turner, of the Monatiquot Rubber Works Co., states that his company has fallen into line to enable its employes to escape the high cost of living. The company has plowed, harrowed, and otherwise developed a portion of its property at South Braintree which has been allotted to its employes for cultivation. In some instances the seed for such cul-

tivation has been distributed free and in other instances furnished the employes at reduced cost.

* * *

The Boston Rubber Shoe Co. is preparing plans for a four-story brick addition to its Edgeworth plant.

THE RUBBER TRADE IN RHODE ISLAND.

Our Regular Correspondent

THE rubber mills of Rhode Island continue to be operated at their utmost capacity, with sufficient orders ahead to maintain the present conditions for an indefinite number of months. Evidence that the Rhode Island rubber factories are engaged upon Government contracts is shown in the list of manufacturing concerns in the State wherein Government work is being done, that the United States Marshall for this district has recently made public under instructions from the Attorney-General at Washington, and within a half-mile of which unnaturalized Germans are forbidden to go after June 1 without a special permit from the Marshall's office. Included in this list are the following:

Narragansett Rubber Co., Wood street, Bristol; National India Rubber Co., Bristol; Alice Mill of the Woonsocket Rubber Co., Fairmont street, Woonsocket; Collyer Insulated Wire Co., North Main street, Pawtucket; Tubular Woven Fabric Co., Main street, Pawtucket; Washburn Wire Co., East Providence; Davol Rubber Co., Providence; Revere Rubber Co., Providence; Mechanical Fabric Co., Providence; New England Butt Co., Providence, and the O'Bannon Co., West Barrington.

* * *

At the plant of the Revere Rubber Co., Providence, a large sand-blast mechanism is being installed.

The Joseph Banigan Rubber Co. and the Woonsocket Rubber Co., subsidiaries of the United States Rubber Co., have filed certificates giving notice of substantial reductions in their capital stock. The Woonsocket Rubber Co.'s capital stock is reduced one-half, from \$3,000,000 to \$1,500,000, and The Joseph Banigan Rubber Co. reduces its capitalization from \$1,500,000 to \$1,250,000.

The National India Rubber Co. at Bristol reports an unusually busy period, the operatives turning out an average of 47,000 pairs of rubber shoes a day. Increased freight and railroad facilities are being added to the local station to handle the additional product.

* * *

The International Rubber Co., at West Barrington, went on day schedule the past month and expects to so continue indefinitely. The concern is manufacturing carriage cloth, and has been in operation on day and night shifts for several months. The demand for carriage cloth, however, is not so brisk at the present time as it has been for more than a year, so that the night shift has been discontinued.

* * *

The first outing and chicken dinner of the season under the auspices of the F. O. B. Club of the Revere Rubber Co. was held at Emery Park the early part of the past month, upwards of 75 members and guests being in attendance. A baseball game between the married and single men was a feature of the athletic program, the former winning by a score of 7 to 3. Prizes were awarded to the winners in the several sporting events and vocal and instrumental music followed.

* * *

Josephus Farron, Jr., for several years assistant in the laboratory of the Woonsocket Rubber Co.'s Alice Mill, has accepted a position as assistant to State Chemist and Sanitary Engineer Stephen De M. Gage, connected with the State Board of Health

The Rubber Trade in Great Britain.

By Our Regular Correspondent.

THE long winter, with snowstorms and frost up to the middle of April, has decreased the demand for water-proofs and oilskins and incidentally for bicycle tires. Of course the weather is not the sole cause of the slackness in the proofing industry, outside Government orders, because the conditions regarding freight and export, referred to on former occasions, have become more accentuated. Moreover, buyers who were frantic to get their orders placed six months ago are now showing great reluctance to accept delivery in bulk. A consequence of this is that goods are being closely scrutinized to see whether they come up to the standard ordered so as to give plausible grounds for rejection if such a course recommends itself under the circumstances of the moment. A year or so ago foreign orders were only accepted by one prominent manufacturer on the proviso that the goods as dispatched must be accepted and that no complaints would receive attention.

CHEMICALS AND COMPOUNDING INGREDIENTS.

In the important domain of rubber chemicals, America has a pull over Great Britain at the moment with regard to sulphur, as she can supply her own requirements. This is reflected in the current prices in Britain and New York. Not only is the price now very high here, but the material has now been placed under official control. This may probably lead to the utilization of certain sulphurs obtained as by-products in chemical manufacture which have hitherto been rejected by the rubber works on account of their odor or some impurity which might not really preclude their use to advantage if given a proper trial. Lamp black in the form of high-grade carbon black, now being so extensively used in the rubber trade, is another article in which America scores by a large home output. As regards barytes, the embargo put on the export from America is of no concern to us, because our own output is being increased largely and whatever the users may think about it the stoppage of American exports has been received with satisfaction by mine owners.

RUBBER STATISTICS SUPPRESSED.

For certain reasons, statistics of various trade details of exports and imports have now been suppressed and the rubber trade is among those affected. Statistics, of course, are not widely read but there is always a certain number who find them illuminating and useful, if not absolutely essential, and who will deplore their absence.

PLANTATION RUBBER.

With regard to plantation rubber the figures for the past twelve months or so show such a large increase as to indicate either that the yield per acre has greatly exceeded the estimates or that the acreage under rubber cultivation has been understated. This increased yield seemed to cause some concern at the meeting of the Rubber Growers' Association, and it was urged that a census should be taken with regard to the probable output of rubber in forthcoming years. A more effective control of this output has been advocated in more than one quarter, more particularly in connection with the important position held by America as the purchaser of the total British output. The idea is held that although things may be all right when trade conditions in America are good, the British planters would be in an awkward position if the American demand fell off owing to a depression of trade.

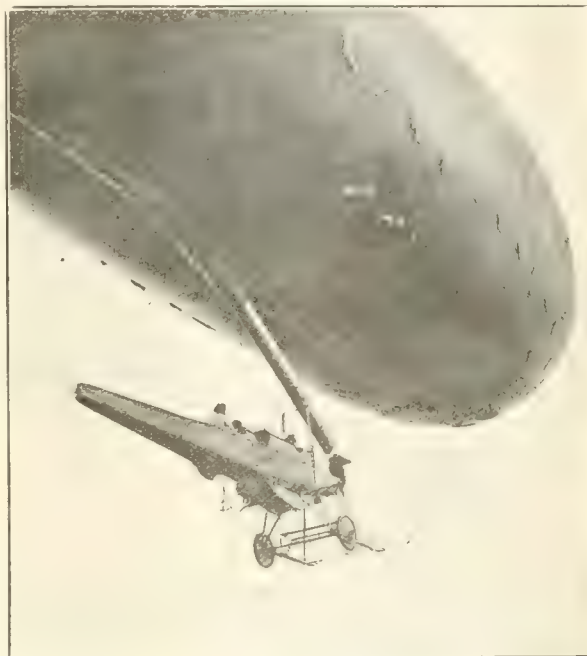
CABLE MAKERS' ASSOCIATION.

On the death of A. H. Howard, who had for many years been secretary of the association, the post has recently been taken over by L. B. Atkinson, a director of W. T. Glover & Co., Limited,

of Trafford Park, Manchester. The association, the headquarters of which are at Sardinia House, Aldwych, London, has been in existence over 20 years and the cables that bear its distinctive mark are of a recognized standard quality.

THE EYES OF THE SUBMARINE PATROL.

One of the most effective means of dealing with submarines yet devised by the British navy is the small scouting dirigible, shown in flight by the accompanying illustration. The car is a slight



modification of that of a monoplane with rubber-tired wheels beneath for landing. The head of the pilot can be seen near the front and that of the observer behind him, but the whirring blades of the propeller have been lost to view because of their rapid motion. Hundreds of these small airships are constantly tracking commerce destroyers in the English channel. In clear, calm weather submarines can be seen when under water, and bombs dropped upon them. The dirigibles are also equipped with wireless apparatus for summoning patrol boats.

TRADE NOTES.

The Gee Cross Rubber Co., of Hyde, near Manchester, has established a new branch works for the manufacture of tubes and accessories for the cycle trade at Burton-on-Trent, a town hitherto better known in connection with the manufacture of beer than of rubber. Mr. Saunders, who is the manager and moving spirit, was formerly manager of the Garton Rubber Company's works.

The De Luxe truck tires of The B. F. Goodrich Co., now well known in America, have just been introduced to the British market through the London and provincial depots, though it is too soon to say anything definite with regard to their reception. For the benefit of English readers I may say that the term "truck" in America is synonymous with the term heavy commercial vehicle in England. Up to now the company's principal tire business has been in pneumatics for pleasure cars and light lorries, and these have established for themselves a favorable reputation. A prominent part of the business done is with the Ford Motor Co., all the cars turned out of the Manchester works being fitted with them.

The Macintosh pneumatic tire is this season being sent out with a new tread which I hear highly spoken of. This tire is marketed locally by the Astra Rubber Co., 231 Deansgate, Manchester.

The bicycle is experiencing a revival, owing to the petrol restrictions, and special attention to bicycle tires is being paid this season by several makers. In this connection the heavy high-grade tandem mottled tire, made by W. A. Bates, Limited, St. Mary's Mills, Leicester, and bearing the legend "All-Weather," may be mentioned. The new prices are, wired-on cover 11s., tube 5s.

The Moseley motor tire is put before the public this season without any advertised improvement on its established merits. The new prices are:

	Grooved Cover.	Tube.
10	1 10 0	1 10 0
12	1 18 0	1 18 0
14	2 0 0	2 0 0
16	2 10 0	2 10 0
18	2 18 0	2 18 0
20	3 0 0	3 0 0
22	3 10 0	3 10 0
24	3 18 0	3 18 0
26	4 0 0	4 0 0
28	4 10 0	4 10 0
30	4 18 0	4 18 0
32	5 0 0	5 0 0
34	5 10 0	5 10 0
36	5 18 0	5 18 0
38	6 0 0	6 0 0
40	6 10 0	6 10 0
42	6 18 0	6 18 0
44	7 0 0	7 0 0
46	7 10 0	7 10 0
48	7 18 0	7 18 0
50	8 0 0	8 0 0

The Goodyear Tyre & Rubber Co., Limited, of Kingsway, London, has been busy establishing provincial depots at Birmingham, Glasgow, Belfast, Manchester, Bristol and Dublin, while a more recent American competitor for the British trade is the Firestone tire, which has already aroused considerable interest.

P. D. Saylor, managing director of the Goodyear Tyre & Rubber Co., (Great Britain) Limited, is now a captain with the Canadian forces in France, in the medical division. Mr. Saylor, who formerly was a physician, proffered his services early in the war, but they were not needed at that time. When the offer was repeated recently, the authorities accepted it and gave him a commission as captain.

THE RUBBER GROWERS' ASSOCIATION.

AT the annual meeting of The Rubber Growers' Association, at the Cannon Street Hotel, London, England, March 30, Sir Edward Rosling was elected chairman for the ensuing year, and Sir John Anderson, vice-chairman. Nineteen ordinary



SIR EDWARD ROSLING.

members of the council of the Association were then elected as follows: Charles Emerson, A. A. Allen, M.P., Sir A. Sharp Bethune, Bart., L. T. Boustead, A. Bryans, A. O. Devitt, W. Forsythe, Norman W. Grieve, H. Eric Miller, T. C. Owen, The Rt. Hon. Sir West Ridgeway, G. C.B., G. C.M.G., K. C.S.I., Thos. Ritchie, F. A. Roberts, J. Alec Roberts, W. Shakspeare, E. B. Skinner, The Hon. C. H. Strutt, Sir Frank A. Swettenham, G.C.M.G., C. E. Welldon.

The Association will be represented on the general committee of the Rubber Trades Association of London by the following members: J. M. Allinson, F. W. Barker, Charles Emerson, Sir Edward Rosling; and on the Panel of Arbitrators of the Rubber Trade Association of London by the following: Sir A.

Sharp Bethune, Bart., Charles Emerson, Norman W. Grieve, H. K. Rutherford and Noel Trotter.

According to the eighth report of the Council the membership of the Association has increased 105 since the issue of the last report and now totals 767, consisting of 489 companies and 278 individuals as follows:

No.	Companies operating in	Authorized capital. £ Sterling.	Issued capital. £ Sterling.	Acreage owned.	Acreage planted or inter-planted with rubber.
273	Malaya	25,607,792	22,831,828	896,012	502,766
87	Ceylon	14,977,428	12,345,159	357,074	131,725
34	Sumatra	6,493,250	4,980,767	320,834	89,480
30	Java	5,373,850	4,469,602	668,587	75,127
22	S. India and Burma. 2,211,316	1,862,182	1,033,372	103,372	37,739
21	Borneo	2,730,000	2,094,297	176,974	31,248
2	Other countries	84,000	84,000	5,000	2,060
469		57,567,636	48,367,835	2,527,853	870,145
9	Trust companies	4,452,660	2,661,667	.....	.....
		62,019,896	50,998,902	.....	.....

Note.—There are also 11 company members not owning rubber estates.

In his address the chairman, Charles Emerson, made the following interesting statements regarding the 1916 rubber production, the 1917 estimate and future prospects generally:

The world's output increased in 1916 by some 27 to 28 per cent, an increase due mainly to the additional production of plantation rubber; which rose by nearly 42 per cent as compared with 1915. The approximate production of the world for 1916 was 201,598 tons, of which plantation claims no less than 152,650, Brazil 36,500 and other kinds a modest 12,448. Of this amount the United States took 115,609 tons. Great Britain consumed 26,812 tons, but we imported 75,240 tons, of which, therefore, 48,428 were exported again. Of the plantation production the United States took 85,531 tons and Great Britain imported 57,095 tons, a great deal of which was, of course, re-exported, but there appear to be no figures to show what the actual consumption of plantation in this country was. It is estimated that the value of the plantation rubber which went into the United States during the year was no less a sum than £25,000,000. At the present time when large exports to America are of first importance, this figure is significant. Our commodity is an extremely valuable national asset, and when one remembers that as recently as the year 1910 the total plantation production was but a paltry 8,000 tons, one may, I think, describe the rapid development of the industry as one of the romances of commerce. We owe a great debt of gratitude to the men in the East, who, despite all difficulties and a somewhat alarming shortage of assistants, have supplied the world with so largely increased a crop. The estimated world's production for 1917 is 242,000 tons, say, 192,000 plantation, 37,000 Brazil and 13,000 other sorts.

I shall say but little as to the future. My predecessor, like the cautious Irishman he is, declined the role of prophet, and I do the same. Suffice it to say that, so far, demand has kept pace with supply, and one hopes that it may continue to do so. But of the immediate future it is, I am afraid, safe to say that our difficulties must increase progressively till the end of the war. The problem of transport is a serious one; the problem of arranging for leave for men in the tropics must before very long become acute; and there are other elements of embarrassment which it would serve no useful purpose to detail. That the difficulties and perplexities which confront us may be met and surmounted is our earnest hope, and we may perhaps take heart of grace from the fact that, up to the present, we have come through far better than in the fatal month of August, 1914, the most optimistic of us could have dared to anticipate.

NIPPLES AND TRANSPARENT GOODS.

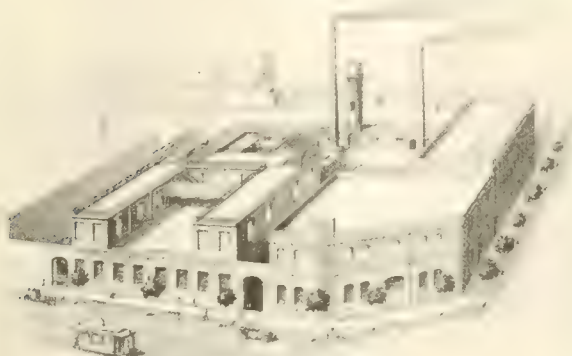
The Peerless Seamless Rubber Co., Limited, of Richmond, London, claims to have been the first British firm to establish a nipple and valve department after the war broke out. For over two years the company has also turned out large quantities of the finest high grade transparent goods, which have found a market both here and abroad. It is hoped to establish this industry so firmly as to make it impossible for German producers ever to rule the British market again.

The Russian rubber factory, "Prowodnik," will issue 180,000 shares of a par value of 100 rubles, which are offered at the rate of 163½ rubles each.

AN ENTERPRISING SPANISH INDUSTRY.

AN important concern in the Spanish rubber industry is that of Blasi, Sagué & Pallás, of Barcelona, whose factory, pictured here, gives employment to 300 hands in the manufacture of a large variety of goods of hard and soft rubber. In fact, this firm claims to be the first to manufacture hard rubber tubes and syringes in Spain, all such goods having previously been imported.

This firm manufactures an extensive line of hard and soft rubber surgical goods and druggists' sundries, making a widely diversified line of molded goods, packing, hose, mats, tire treads,



FACTORY OF BLASI, SAGUÉ & PALLÁS, BARCELONA, SPAIN.

solid tires and rubber heels, as well as specialties for sugar refineries, breweries and hat factories, and hard rubber parts for telephones and general electric use.

The members of the firm are all practical men, well versed in the manufacture of rubber goods. Mr. Blasi, who has charge of the factory, was superintendent of a leading concern for 30 years, previous to his resigning to form this firm. Mr. Pallás was a traveling salesman for the same house for 10 years. Mr. Sagué has charge of the finances of the concern.

GERMAN RUBBER NOTES.

RUBBER PROSPECTS AFTER THE WAR.

REPRESENTATIVE rubber men of Germany are of the opinion that England intends to make them pay the highest price for rubber and colonial products and are already trying to advance prices. This is to be opposed by resuming the rubber industries as far as is possible, combining for purchases and buying elsewhere until British prices are reduced.

They maintain that artificial raising of prices cannot be maintained in the rubber market, even when the demand is heavy, because of the increasing output. By the time the war is over, all plantations opened up before 1909 will put their full production on the market. Again, when rubber is high, manufacturers will cease using it for many purposes that were profitable when rubber was cheaper, whereas cheap rubber increases the number of modes of its application. If rubber sold at a price between 36 and 42 cents per pound, many new industries now unprofitable would come into existence.

Synthetic rubber is not to be overlooked; although little is heard about it. Chemists are hard at work, and it may be said that wonderful progress has been made in the chemical industry in general. This industry, built up during 60 years of incessant and systematic labor, cannot be wrecked through mere abrogation of German patents.

Many chemical ingredients can be prepared synthetically, though there are some for which substitutes have not yet been found, but other countries than England and her colonies pro-

duce them. It is felt, however, that whatever British feeling may be, the colonies will be unwilling to lose German custom and will not refuse to deal on the same conditions as with other nations.

GERMAN RUBBER INDUSTRY PROFITS.

From German sources it is learned that in spite of the war, German rubber companies have made large profits during the past year. The net profits of 19 representative firms for 1915-16 were 12,000,000 marks, against 10,000,000 marks the year before, but how much of this resulted from the manufacture of goods other than rubber is not stated.

The Continental-Caoutchouc & Gutta Percha Co., Hanover, reports gross profits of 9,451,397 marks for 1916, against 9,729,988 marks the year before; net profits were 7,759,471 marks, against 6,733,135 marks in 1915. A dividend of 30 per cent will again be declared. The value of goods on hand is 6,153,000 marks (year before, 5,253,596 marks), and advance payments for bought rubber amount to 816,021 marks, against 549,002 marks for the previous year.

The following figures for certain insulated wire and cable companies may prove interesting:

The Deutsche Kabelwerke A. G., Berlin-Lichtenberg, records gross profits of 1,340,000 marks for 1916 as against 1,480,000 marks for 1915. Net profits are 620,000 marks as compared with 700,000 marks, and a dividend of 8 per cent will be paid.

The Kabelwerke Duisberg, A. G., booked gross profits of 2,380,000 marks in 1916 and net profits of 1,480,000 marks. The year before, gross and net profits amounted to 2,280,000 marks and 1,620,000 marks, respectively. The dividend is 25 per cent as against 30 per cent the year before.

Norddeutsche Kabelwerke, A. G., of Neu-Köln, Berlin, show net profits of 220,000 marks as compared with 130,000 marks in 1915. This company intends to increase the share capital with 1,000,000 marks, in order to be able to execute larger government orders.

The feeling in Germany prevails that the German rubber industry has acquitted itself creditably of its difficult task in the past year and has seen to it that there was no shortage of articles needed for the war. This year, too, it is expected that military demands will be fully satisfied.

REGULATIONS CONCERNING NIPPLES.

When the government found that dealers were importing large quantities of nipples from Holland and other neutral countries and selling them at exorbitant prices, the stock was requisitioned and stored at a central depot in Berlin and made obtainable only through chemists at the low price of 0.35 mark each.

Whoever wants to buy one, must present the birth certificate of the child for whom it is intended; if the child is under a year old, the applicant is entitled to two nipples. When one is worn out, a second may be bought on returning the old one. No nipples are allowed for children over 12 months old.

A GROUP TO ARRANGE RUBBER SUPPLY.

The Association of Import Trade in Berlin has formed a rubber group to handle the question of the supply of rubber. Several of the largest rubber firms are represented on the committee.

NON-ELASTIC TIRES NOW PERMISSIBLE.

It is understood that the Chancellor of the Exchequer has, after long consideration, cancelled the introduction of the employment of non-elastic tires for motor trucks and trailers. Consequently there is an increased demand for second-hand trucks. But practically the only ones to be had are those with cardan drive, and they, running on rubber tires, are considered a very poor investment in these days of German rubber famine. The cancellation, therefore, does not appear to have greatly diminished the difficulties of transportation, due largely to the lack of rubber.

Rubber Planting Notes.

RUBBER IN BORNEO.

EIGHTEEN leading companies, with a total authorized capital of £2,250,000 and subscribed capital and loans amounting to £2,111,000, are at present operating in the British North Borneo Co.'s territory. Two large tobacco companies have also planted 1,000 acres of rubber while several Chinese and Japanese own considerable properties.

The Mycologist and Director of Agriculture reports that the area under rubber in British North Borneo is 29,827 acres, not including estates of less than 100 acres. The area in full tapping is 9,806 acres, but 570,000 trees are being tapped over areas not yet in full tapping, equivalent to 4,400 acres at the rate of 130 trees per acre. The total area under tapping is, therefore, approximately 14,000 acres. At the end of 1915, 9,636 laborers were employed on the estates, as follows: 4,065 Chinese, 3,521 Javanese and 2,050 other races, chiefly natives of Borneo. The export of plantation rubber in 1915 amounted to 1,050 tons, against 613 tons in 1914.

The land concessions of the principal companies are practically freehold—999 years' lease, free of quit rent or cultivation clause of any kind. The government has undertaken not to impose an export duty on plantation rubber for the next 40 years.

Three rubber companies are operating in the British protectorate of Brunai, while in the Sarawak territory the Sarawak Rubber Estates, Limited, has issued capital of £200,000 and a planted area of 3,545 acres, which yielded 420,212 pounds of rubber in 1915. The estimate for 1916 is 565,339 pounds. Besides these companies, there is also one in Lawas.

In Dutch Borneo the four principal companies have a combined issued capital of £359,615, and a planted area of 4,593 acres under *Hevea*, and 1,865 acres under *Ficus*. In the south-east of the island, the Hayoep Rubber Estates' production in 1915 was 346,681 pounds of rubber, at a cost of 1s. 4½d. per pound, and a dividend of 10 per cent was paid. The estimated crop for 1916 is 451,000 pounds.

COSTS AND YIELDS OF PARA IN UGANDA.

G. Brown, F. L. S., of the Kivuvu estate, Uganda, submits some interesting details concerning the yields and costs of Para rubber on his and several other plantations.

Tapping at Kivuvu commenced in 1914 with 6,000 trees and was conducted over a period of 7 months. The following year the number of trees was increased by 4,000, and in 1916 by 2,000 more, bringing the total to 12,000. The methods followed were the basal V and alternate day tapping on one-quarter section of the tree only. For the last two years, operations extended over 9 to 10 months. The average yields per tree of dry rubber were:

Ounces.

The total yields of dry rubber in 1915 and 1916 were 7,125 pounds and 16,700 pounds, respectively.

Reports in 1915 from the Government Farm at Kakumiro and at Entebbe Botanic Gardens show that on the former the yield per tapping on the half-herring-bone system was 0.13 ounce and 0.1 ounce on the basal V method.

At Entebbe Gardens 535 trees yielded 1,132 pounds, or an average of 2.13 pounds per tree. Tapping here was very irregular, only 60 trees being tapped in some months.

The cost of production at Kivuvu has diminished year by year, just as the crop has increased, so that the comparative costs per pound of rubber over the three years work out as follows (values being stated in United States currency):

	1914	1915	1916
Preparation of area	8.6	8.9	2.7
Tapping	6.3	5.1	3.7
Curing and packing	1.5	1.3	1.4
Preparation of tools	9.3	0.8	0.3
Freight Kta to London	3.5	4.5	4.5
Management	2.0	2.0	2.0
Landed in London	22.2	17.1	14.6
Market and selling charges	3.0	3.0	3.0
Cost to place in hands of purchaser	25.2	20.1	17.6

It is interesting to compare the 1915 cost and sale prices of rubber from Kivuvu with those for Malayan rubber of the same year.

Estate.	Production (in pounds)	Cost per pound in cents.	Sold in London.
Kivuvu, Uganda	7,125	17.1 (to London)	52.6
Kamuning, Perak	668,227	21.5 (on plantation)	53.5
Singapore, Para	359,725	30.0 (f. o. b.)	52.9
Tremelbye, Selangor	543,356	25.0 (f. o. b.)	52.7

From these figures, it will be seen that the cost of production at Kivuvu was less than on any of the three Malayan estates, a fact all the more striking since the crop from the former was so very small in comparison with that from the latter, while the prices obtained do not differ greatly for the four estates.

It is estimated that an acre, planted with 108 trees, may be safely capitalized at £20. The time it takes a rubber estate to become remunerative may be judged by the Magigye estate. In 1911 a certain area was planted, with one-year-old seedlings. In 1916, 50 per cent of these were ready for tapping and gave an average yield of 6¼ ounces per tree, which put that area on a remunerative basis.

On the whole, it would appear that the prospects for rubber cultivation in Uganda are very favorable. Kivuvu, for instance, gave profits of 16 per cent in 1914; 25 per cent in 1915, and 54 per cent in 1916.

CEYLON RUBBER EXPORTS, 1916.

The report of the Ceylon Chamber of Commerce for the half year ended December 31, 1916, gives the total exports of rubber from Ceylon for the year 1916 as 54,698,729 pounds at an average price of 1.79 rupees, against 46,566,187 pounds at an average of 1.65 rupees in 1915.

The distribution for 1915 and 1916 was as follows:

	1916.	1915.
United Kingdom	23,812,305 pounds	25,183,748
United States	27,249,589	18,607,691
Canada and Newfoundland	6,720	392,495
Australia	797,091	964,697
France	1,803,217	698,992
Russia	293,674	332,200
Italy	347,632	.....
Other countries	389,501	386,364
Totals	54,698,729	46,566,187

It will be noticed that during 1916 the United States became Ceylon's biggest customer, and that French and Italian purchases were greatly increased. Canadian consumption almost ceased. Average prices fluctuated from 2.78 rupees per pound early in January to 1.34 in August and up to 1.79 late in December.

PLANTATION RUBBER IN CEYLON.

According to the latest reports from Ceylon, the area devoted to the cultivation of rubber is 251,000 acres, an increase of 10,500 acres over 1915. The rubber industry in Ceylon has advanced by leaps and bounds. In 1905 the area under *Hevea* was 40,000 acres; one short year later this had expanded to 104,000 acres; now, within ten years, these figures have more than doubled, and show that over one-third of the total culti-

vated land of the island is under rubber. Kelani Valley and Kalutara are the most important rubber districts, the areas being 53,235 and 50,193 acres, respectively. Few new plantations have been opened and it is hardly expected that any considerable enterprises in this direction will be undertaken in the immediate future.

The exports of rubber for 1916 again showed an increase, being 54½ million pounds, which is 8 million more than for 1915. America again headed the list of buyers with 27 million pounds, or half of the total shipments. The United Kingdom came second, having bought about 23½ million pounds.

Whereas Ceylon pale crêpe rubber compared very favorably with that from other sources, Ceylon ribbed smoked sheets are often over-smoked and not too well graded.

NODULES IN THE CORTEX OF HEVEA TREES.

This is the subject of an investigation by G. Bryce, B.Sc., assistant botanist and mycologist, the results of which are reported in Bulletin No. 28 of the Ceylon Department of Agriculture. These swellings on *Hevea* stems, not the result of tapping wounds, and often termed "burrs," take the form of small woody bodies of varying shape and size. Although comparatively rare in young trees, they appear more frequently in trees which have been tapped for some time. In their younger stage nodules may cause only a slight external swelling, but after several years' growth they give a characteristic gnarled, knotted appearance to the stem and may interfere with tapping or even render it impossible in trees badly affected.

Of their development, and ideas regarding causes Mr. Bryce writes:

About the cause of the production of nodules much difference of opinion prevails; several explanations have been advanced, but none so far has found general acceptance. A nodule at first is a little isolated body of woody tissue lying in the cortex usually about the size of a "pea" when first observed, and easily "shelled out" with a penknife. There is little to indicate its presence at this stage, occasionally a small protuberance or a slight cracking of the bark externally. In later stages these "peas" increase to the size of a "hen's egg"; or many "peas" fuse together and form an irregular mass; or, again, large sheets of woody tissue are produced. At the same time growing points originate, which grow inwards and unite with the stem wood, and thus ultimately the nodular masses become connected with the stem at many points. As the nodules grow larger the stem becomes gnarled; the cortex cracks and latex oozes out; finally, the entire stem to a height of 5 or 6 feet from the ground is affected. In this condition it is impossible to carry on tapping, and the tree is useless.

Mr. Bryce finally summarizes the results of his investigations as follows:

(1) Nodules are produced in the cortex of *Hevea Brasiliensis* as the result of an alteration in the latex vessel content.

(2) This alteration has not been connected with the attack of any parasitic organism, but appears rather to be due to physiological changes in the latex.

(3) The tendency to suffer alteration in the latex vessel content appears to be confined to certain individual trees which have a predisposition to develop this condition.

(4) Four types of nodule have been distinguished:

(a) Nodules formed round altered latex vessels.

(b) Nodules formed round lesions in the cortex into which latex has oozed and coagulated. May occur in *Hevea* tree.

(c) Nodules formed round areas into which latex has oozed and coagulated; the coagulated latex occupies the intercellular spaces without lesion of tissue. May occur in any *Hevea* tree.

(d) Nodules formed under unknown conditions round areas of cortex from which latex may be entirely absent. Rare.

(5) Globular shoots formed by the subsequent growth of latent buds after these have lost their connection with the stem occur in both tapped and untapped trees. They are distinguished from nodules by the absence of a core, and they never form large masses of woody tissue as nodules do.

(6) Nodules of (a) type do not occur on untapped trees.

(7) Nodules occur on *Hevea* in its native habitat in Brazil; and in tropical America and the Eastern tropics where it has been grown in plantations.

(3) The percentage of trees which develop nodules is very small.

(9) Tapping appears to induce nodule formation in predisposed trees.

(10) This abnormal condition is apparently not infectious.

MODE OF OCCURRENCE OF HEVEA LATEX VESSELS.

The distribution and mode of occurrence of latex vessels in the cortex are obviously of great importance as factors influencing the amount of latex obtainable by tapping. Since Scott's investigations in 1885 many other rubber experts have made important researches, but up to the present no record exists of any investigations into the number of cylinders at different heights of the stem in mature trees, or of any seasonal variation in these numbers. In order to elucidate this and several other obscure points in connection with the subject a more detailed investigation than any hitherto was undertaken by G. Bryce, B.Sc., and L. E. Campbell, B.Sc., F.I.C., respectively assistant botanist and mycologist, and rubber research chemist of the Ceylon Department of Agriculture. Several untapped trees planted in 1905 at the Experiment Station, at Peradeniya, were chosen, and the results were confirmed by examination of trees growing on plantations in several districts of Ceylon.

The findings, as stated in Bulletin No. 30, follow:

(1) Considerable variation occurs in the number of stone cells in the cortex of different trees. There is consequently variation in the degree of disintegration of the latex vessels.

(2) There was evidence of the diminished production of latex vessels in February and March, when the trees were changing leaf.

(3) The number of rows of latex vessels in the cortex decreases with the height above ground level.

(4) The distance between the rows of latex vessels did not usually increase in proportion to the distance from the cambium. The average of the distances between the rows was approximately 0.2 millimeters.

(5) Well-defined cases of connections between neighboring rows of latex vessels were not observed. Several examples of bifurcation of rows were, however, noted.

(6) The course of the rows may not be invariably regular and parallel. Sometimes the rows undulate, and the same neighboring rows vary in distance apart at different points.

(7) In general the thicker the cortex the more rows of latex vessels did it contain, though the increase was not great.

(8) The distance from the cambium of the first interrupted row was approximately 1.5 millimeters; this represents the inner cortex or food-conducting tissue of the tree, and should be left untapped.

THE SITUATION IN MALAYA.

By a Special Correspondent.

A RATHER warm discussion of the question of granting land to aliens took place at a recent meeting of the Planters' Association of Malaya, held at Kuala Lumpur, Federated Malay States.

It was maintained that although from the point of view of the local government it would be unbusinesslike to refuse capital of any sort directed to the opening up of land, planters, as such, and as Britishers, objected to a "lot of aliens, be they Americans, Danes or what not," coming into the country at a time when circumstances demanded British money and control elsewhere. Past experience had taught what difficulties were to be expected from allowing aliens to monopolize business, and it was especially undesirable that German capital should enter, which would undoubtedly result from the admission of American capital. Meanwhile, 25,000 acres of land had already been granted to an American concern.

The question was then raised whether, if Americans were allowed to open large plantations and to develop them at express speed the government would order that they import their own labor.

It was finally agreed to forward to the Chief Secretary of the Federal Council an expression of the Association's objection to the "alienation of land at a time when British capital and superintendence is unavailable for opening up such land."

DEATH OF A CHINESE RUBBER PLANTER.

The death of a prominent Chinese, Towkay Loke Yew, of Kuala Lumpur, is announced. The deceased, who was 72 years old, came to Malaya about 60 years ago, and began his prosperous career as shop assistant. He possessed extensive properties, three rubber estates, coconut groves, cement works, oil mills, etc., and held large interests in several enterprises, such as the Malayan collieries, the Straits Trading Co., the Straits Steamship Co., Perak and Selangor, all of which owed much of their development to his activities, and his services were duly recognized in both China and Great Britain. The University of Hongkong bestowed on him the honorary degree of LL.D., and England created him a Companion of the Order of St. Michael and St. George. Kuala Lumpur honored him by turning out in large numbers to attend the funeral.

IMPORTS OF RUBBER MANUFACTURES.

The importation of manufactures of rubber forms a significant part of the trade of the Malay Peninsula. The total imports into Straits Settlements for four years were: 1913, £201,821; 1914, £194,913; 1915, £276,924; 1916 (nine months), £212,025.

Tires, which were not specially mentioned before 1915, have since been given a special heading as they now form the most important part of the manufactured rubber imports, the value for nine months in 1916 being £192,620. It is interesting to note that whereas the amount supplied by Japan before the war was about one-half of that from the United Kingdom, it is now double.

THE SITUATION IN THE DUTCH EAST INDIES.

By a Special Correspondent.

INTERNATIONAL EXHIBITION AT SOURABAYA.

It is proposed to hold an international exhibition at Sourabaya, Java, from May 1 to November 1, 1919, or as soon as possible after the conclusion of peace. This exhibition, which will be known as the *Algemeene Nederlandsch-Indische Tentoonstelling Soerabaya* (called in brief the A.N.I.T.A.), will be a general exhibition of agriculture, cattle-breeding, fisheries, commerce and industries, in the Netherlands East Indies.

Although the exhibition is a private one promoted by prominent residents of Java, the government has officially recognized its aims and objects by appointing a commissioner, who is also one of the committee of promoters, and by authorizing the acting director of the Department of Agriculture, Industry and Commerce to hold a seat on the Advisory Board. A money grant is also being given by the Municipality of Sourabaya in aid of the expenses.

The exhibition will be held during the dry season and coincident with the completion of the new harbor works at Sourabaya—the largest and most modern in the Dutch East Indies. A special section will be devoted to agricultural implements and electricity in the widest possible sense of the terms, and special buildings will be set apart to meet the requirements. The exhibition grounds will occupy about 75 acres. This opportunity will doubtless be utilized to the full by American and Japanese exhibitors.

INTERNATIONAL RUBBER CONGRESS AWARDS.

The jury of the International Rubber Congress and Exhibition at Batavia, 1914, has made the following awards:

- I. Planters' Association of Malaya Cup—for the best commercial sample of *Hevea* rubber: Highlands and Lowlands Estates, Klang.
- II. Grenier's Rubber News Trophy, presented by the owner of "Grenier's Rubber News," Kuala Lumpur, for the best commercial sample of *Hevea*-rubber produced in the Dutch East Indies: Tjilentab, Tjibadak Estates.
- III. Van Laer Cup, presented by H. van Laer, superintendent of estates at Pematang Siantas, for the best commercial sample of *Hevea*-rubber produced in the Federated Malay States: F. M. S. Rubber Co., Kuala Lumpur.

IV. Medals, presented by the Rubber Growers' Association, London, for the three best commercial samples of smoked sheet:

Gold Medal: Highlands and Lowlands Estates, Klang, F. M. S.

Silver Medal: Federated Malay States Rubber Co., Kuala Lumpur, F. M. S.

Bronze Medal: Yamseng Estates, Perak, F. M. S.

Commercial rubber means rubber produced from rubber trees grown on any one estate, out of which at least 5,000 kilos of rubber have been forwarded for sale in one of the rubber markets during the first half of the year 1914.

TRANSPORTATION OF COOLIES.

The contract between the Deli planters of Sumatra and the *Kon. Paketvaartmaatschappij* concerning the transportation of coolies from Java to Deli and *vice versa*, has expired. By the new contract, this shipping company can no longer be held responsible for the coolies, and in case of desertion, indemnification cannot be claimed. On the other hand, free passage, second class, is given to a European supervisor, as well as fourth class to one overseer over every 100 coolies.

THE CENTRAL RUBBER STATION OF JAVA.

This comparatively new institution, opened at Buitenzorg in September, 1915, was founded to help planters to find new and improved methods of preparation and to turn out a product of excellence and uniformity.

The chief problem that the director, Dr. O. de Vries, and his assistants are trying to solve is the difficult one of fixing a standard method for inspecting and judging rubber that can be applied to all institutions.

The establishment began with a capital of about 41,000 florins [\$16,400], and is well supported by members and others interested in its prosperity. It is well equipped with the necessary instruments and machinery, including hydraulic and autoclave presses, Schopper, punch, mixing and crèping machines, calender and vulcanizing-pan.

In a recent report covering his work in an advisory capacity on the East Coast of Sumatra in 1915 and 1916 Dr. Vriens takes up preparation of crude rubber, water supply, oxidation prevention, coagulants and anti-coagulants, marking to prevent theft, and diseases and pests.

He emphasizes the fact that stains in both sheet and crêpe are often the result of bad water supply, particularly when containing iron oxide. Filtering through alum or fiber of the areng palm works an immediate improvement.

Oxidation with consequent graying of the latex and purpling of the surface of the coagulum can be avoided by the use of sodium sulphate or bisulphate in the preparation of crêpe and unsmoked sheet, but this is superfluous for smoked sheet. These are the principal anti-coagulants now used in latex cups and cans.

In coagulation it is desirable to employ a minimum of acetic acid, 0.5 to 1 grain per liter of latex usually being sufficient.

Coconut water or coconut milk may be used as a coagulant if obtainable at a low transportation cost.

To prevent theft, block and sheet rubber are now marked in ways which do not impair the value. This is also desirable in the case of thin crêpe, but no satisfactory method has yet been found. Possibly a harmless color mark may be devised.

The usual measures for disease prevention are encouraged, particularly removal of creepers and moss from the trunks of trees and clearing away as far as possible all wood and roots on or in the ground so that insects will be deprived of all opportunity to lodge and breed.

Contrary to the opinion of T. Petch, carbolineum is regarded an excellent remedy in case of disease, provided the mixture with water be not too strong and thoroughly emulsified by shaking at the time of use.

THE SITUATION IN BRAZIL.

By a Special Correspondent.

ON March 6 the one hundredth anniversary of the first Brazilian republic was celebrated throughout the country.

In the year 1817, several prominent men of Pernambuco, tired of the royal Portuguese yoke, conspired to overthrow the existing form of government. Twice their intentions were betrayed to the colonial governor, who, the first time, treated the matter as a joke. The second time, however, he gave orders to arrest the conspirators. This was the sign for revolt. The prisons were opened and the governor fled. A federal republic was formed which lasted exactly 74 days. Then the royalists routed the republicans, shot their leaders and reestablished the monarchical government. This revolution was the first step leading to the final establishment of the present republican form of government, and the event was naturally commemorated with great enthusiasm. In Belem, the celebration by the *Associação da Imprensa do Para* took place in the *Theatro da Paz* and was presided over by Dr. Lauro Sodré, governor of the state of Para.

ATTACKS ON GERMAN PROPERTY.

Demonstrations of enthusiasm for the Allies and of hatred towards Germans were not lacking once Brazil had broken relations with Germany. Not always have the people been satisfied to give vent to their feelings in shouts. At Porte Alegre, a mob, infuriated by the German proprietor of a hotel who lost his head and fired at a passing car, wounding one or two of the occupants, sacked and burned the hotel and many German buildings, and broke the windows of all houses suspected to harbor Germans. Pelotas and Rio Grande do Sul were only saved from similar proceedings by the timely arrival of soldiers.

Naturally, Germans are beginning to feel uneasy, and quite a number have gone to Santa Catherine where they no doubt feel safer, as they represent the majority of the population there.

SHIPMENTS AND THE RUBBER BLACKLIST.

Judging from the latest reports, the blacklist on the Amazon has been a great success. It came into effect here on March 29, 1916, from which date to March 30, 1917, crude rubber was exported to the amount of 34,424 tons. Of this, 19,631 tons, or 57 per cent, went to allied and American firms, 12,741 tons, or 37 per cent, to Brazilian and Portuguese firms, and only 2,052 tons, or 6 per cent, to enemy and blacklisted firms.

The distribution by shipments was as follows:

	Tons.	Percentage.
In British vessels to Europe.....	12,919	37.5
To New York	12,797	37.2
In Brazilian vessels to New York.....	8,708	25.3
	34,424	100.0

Enemy shipments were shipped by the "Lloyd Brasileiro" and have increased lately, 480 tons having been shipped between February 6 and March 30, as against 597 tons by British and American firms and 680 tons by Brazilian and Portuguese. In this connection it is significant that the Lloyd apportions space to shippers as follows: 39 per cent to Brazilian and Portuguese firms, 34 per cent to allied and American and 27 per cent to German firms.

Nevertheless, a comparison of exports for 1913-14 and for the 12 months, March, 1916-April, 1917, demonstrates very satisfactorily the decrease for German firms and the increase for allied and neutral firms.

	Tons.	
	1913-14.	12 months ending April, 1917.
German firms	18,264	2,052
Allied and American	11,702	19,631
Brazilian and Portuguese	7,194	12,741
Totals	37,160	34,424

The most striking fact indicated by the above table is the remarkable growth of Portuguese and Brazilian exports since the war.

STORAGE CHARGES ON RUBBER IN TRANSIT.

The *Associação Commercial* is endeavoring to reduce the high storage charges assessed at the port of Para for rubber in transit.

An arrangement has already been made with the port of Para by which 1 per cent of the dues covered in the second month and 3 per cent of those in the third month will be restored.

This arrangement will hold while the actual difficulty of transportation lasts and depends on the orders of the Minister for Traffic to the Inspector of the port of Para.

The *Associação* has already informed the Minister of the terms of the agreement and is now awaiting developments.

FLOODS IN BRAZIL.

Within the last four years the state of Ceara has suffered from three grave catastrophes. The year 1913 saw the country torn by political strife. Hardly had this disturbance ceased, when drought set in, forcing thousands of the inhabitants to leave



A BRAZILIAN NODDIE COLLECTING LATEX

their homes and seek relief in the neighboring states. Towards the winter, many returned, only to experience the heaviest flood that visited the land for years. The sufferings of the people are said to be severe in the extreme and everything possible is being done to help them.

The neighboring state of Maranhão has also suffered from floods, the Itapicuru and Mearim rivers having overflowed.

INADEQUATE TELEGRAPH SERVICE.

So many complaints are made about the radio-telegraph service of the Amazon, that those in authority seem at last to be awakening to the fact that something must be done. Indeed, it has been suggested to abolish this system altogether and make use of the facilities offered by the Amazon Telegraph Company instead. Naturally, this is anything but pleasing to the *Associação Commercial do Amazonas*, which, in conjunction with the Federal Government, undertook to maintain the radio-telegraph

service. They claim that this service should be maintained and supported, and point out that though delays occur, it is a convenience where speedy delivery is not essential. When, however, papers publish letters signed by a number of merchants of the Acre region, in which it is declared that radiograms intended to advise the dates on which vessels from Belem or Manaus are due at certain ports, arrive later than the boats, one is inclined to question the practical value of this vaunted convenience.

PLANTATION RUBBER IN BRITISH GUIANA.

THE rubber-planting industry of British Guiana is progressing slowly but steadily, despite the many disappointments usually experienced in new ventures in tropical agriculture. Reports from inspectors at various rubber-producing centers show that farmers and planters have extended their areas under *Hevea* and are continuing to do so. In some cases, however, small areas had to be abandoned owing to the unsuitability of the soil for its cultivation; also certain areas planted with *Sapium* rubber were discontinued. This accounts for the fact that the final totals of the 1915 report show a small decrease in acreage.

PLANTED ACREAGE.

The following figures are interesting as illustrating the general growth of the industry for the period 1910-15.

Areas Under Rubber.				
	1910.	1913.	1914.	1915.
Demerara	579	1,859	2,196	2,229
Essequibo	1,129	2,142	2,206	1,854
Restigoua	30	501	560	603
Total	1,738	4,502	4,962	4,686

The report from the Botanic Gardens, Georgetown, stated that no foreign seeds had been imported in 1915, as there had been sufficient local seed to meet the demand for plants. Altogether, 21,846 plants were sold during that year.

RAINFALL.

The total rainfall for 1915 was satisfactory, having been 9.53 inches more than in 1914.

The following table, taken from the 1915 Report of the Department of Science and Agriculture, gives the rainfall over 53 years:

RAINFALL AT GEORGETOWN AND THE BOTANIC GARDENS, 1846-1915.													
Period.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Totals.
1846-1856.....	6.84	5.82	7.25	7.41	14.05	13.91	11.09	8.00	2.61	2.46	5.60	10.71	91.75
1874-1879.....	6.55	3.58	5.59	6.39	12.58	14.17	10.01	7.05	4.81	2.64	4.22	14.77	92.36
1880-1889.....	6.48	6.67	4.57	6.52	11.44	11.58	9.95	5.76	2.24	1.79	5.45	11.32	83.77
1890-1899.....	11.52	8.08	8.19	7.31	11.08	13.22	11.77	5.79	2.87	2.81	5.89	13.07	101.60
1900-1909.....	7.61	5.87	9.43	7.83	12.30	11.49	10.00	6.55	5.96	2.21	5.04	11.29	95.65
1910-1915.....	7.85	7.85	10.00	8.43	11.13	14.74	11.17	11.76	6.60	2.72	3.76	3.00	101.46
1911.....	10.17	9.13	14.04	8.43	11.13	14.74	9.63	4.00	4.02	2.30	2.41	87.89	
1912.....	1.23	4.46	1.28	6.26	9.08	8.21	11.24	8.17	1.57	1.89	4.03	16.45	69.87
1913.....	18.18	2.41	7.64	2.09	5.00	9.67	13.71	5.80	4.29	3.96	2.64	15.03	90.42
1914.....	1.79	2.46	2.34	4.22	18.37	9.25	5.37	4.40	5.18	4.80	4.81	6.50	69.49
1915.....	6.41	13.38	.95	5.73	17.65	6.14	8.47	5.06	.66	1.20	4.52	5.83	79.02
Means (53 years).....	7.63	5.99	6.94	7.00	12.27	12.42	12.44	6.67	3.53	2.44	4.90	11.56	93.88

DISEASES AND PESTS.

The plantations suffered to a certain extent from diseases, the South American leaf disease (*Fusicladium macrosporum*) having been the most prevalent. Brown root disease (*Hymenochaete noxia*) and die-bark (*Thyridaria tarda*) also attacked the trees. Root disease (*Fomes scmitostus*), well known in the East, was observed here for the first time.

Fortunately no new serious insect pests were remarked at the Government Rubber Station, Issorora, N. W. D., a species of Coushi ant [*Atta (Acromyrmex) octospina*, Reich] was seen removing and carrying away material from the layer of tissue immediately overlying the cambium of recently tapped trees, causing considerable damage to some trees. This ant has not been met with in other parts of the colony.

Disease has kept away from the Government Farm, Onderneeming, in quite a remarkable manner, consequently the *Heveas* there are in good condition. The accompanying table shows

the yields of experimental tapping of 200 trees averaging seven years of age.

1915.	Number of Tappings.	Dry Rubber, Ounces.	Rainfall, Inches.
August	31	420½	2.94
September	31	744¼	2.95
October	31	864	1.82
November	27	873	7.08
December	27	975¼	8.30

Taking the four completed months September to December the yield has been 3,457 ounces, equal to, say, 216 pounds, or 648 pounds for 12 months, showing a yield of 2.16 pounds per tree per annum.

BALATA.

Several bullet tree seedlings of balata, found growing in the forest behind this station, were dug up and planted in the cultivation in 1911. These trees reached a height of 18 feet during the four years from 1911-1915 and are in good condition.

In connection with balata, it is interesting to learn that experiments to determine the composition of Guiana balata, about which little appears to have been reported, were conducted at the Government Laboratory. Samples from British and Dutch Guiana were submitted to analysis, determinations being made of moisture, resin, crude proteids, other vegetable impurities, mineral matters and gutta. It was found that in the British Guiana samples water varied from 2.5 to 7.1 per cent, resin from 36.4 to 39.6 per cent, crude proteids from 2.6 to 6.3 per cent and other vegetable impurities from 4.2 to 11.7 per cent, mineral matters from .5 to 1.1 per cent, whilst the valuable constituent, the gutta, varied from 40.1 to 52.1 per cent. From the results of the examinations coupled with the history of the samples it was deduced that normal British Guiana balata should contain 45 per cent of gutta and 38 per cent of resin, any proportion of the latter above 38 per cent being regarded as an impurity. It was assumed that on the water-free basis less than 44 per cent of gutta, or resin in excess of 42 per cent, or total impurities in excess of 15 per cent, indicates, as the case may be, either low-grade balata, such as dabray bottoms, or admixture with latex other than that of true balata.

A FRENCH COLONIAL CONGRESS.

A colonial congress, organized by the *Union Coloniale Française* and aiming to bring the home manufacturer in closer touch with the colonial producer, is being held at Paris this month.

A special section devoted to rubber is presided over by M. Jumelle, professor of the Faculty of Sciences of Marseilles. He has distributed among those interested a circular requesting replies to such questions as:

- (1) In what proportion can wild rubbers from Africa, America (not Para), Tonkin and Java, be used in rubber factories?
- (2) What kinds are the most satisfactory?
- (3) How does Brazilian rubber differ (from an industrial viewpoint) from Ceylon or Malayan plantation rubber?
- (4) Which of the three plantation rubbers—Ceylon, Malay Peninsula, Java—is to be preferred?
- (5) What form—crêpes, biscuits, blocks—is preferred?
- (6) How does Cochinchina rubber compare with other plantation rubbers; also the value attached to Ceara, *Funtumia* and *Castilloa* plantation rubber from French colonies as compared with that from other countries?

The result of the questionnaire will doubtless prove valuable.

Recent Patents Relating to Rubber.

THE UNITED STATES.

ISSUED APRIL 17, 1917.

- N**O. 1,222,614. Solid rubber tire. F. H. Field, Passaic, N. J.
 1,222,639. Resilient shoe heel lift. G. H. Lewis, Elyria, Ohio.
 1,222,683. Respirator. D. K. H. Schmidt, Hamburg, Germany.
 1,222,703. Elastic fabric spool protector. J. White, Pasadena, Calif.
 1,222,724. Reinforced pneumatic tires. F. S. Bost, Reading, Mass.
 1,222,735. Wheel for use in wearing shoes. W. C. Gibson, Portland, Oreg.
 1,222,825. Desiccator. H. W. Weber, Peoria, Ill.
 1,222,906. Tire tread. A. W. Torkington, London, England.
 1,223,049. Cushion tire. O. J. Hicks, Centerburg, Ohio.
 1,223,174. Tire valve. W. A. Kell, New York City.
 1,223,204. Airless tire. C. B. Reynolds, Sawville, Calif.
 1,223,331. Demountable rim. I. M. Clark, Los Angeles, Calif.
 1,223,344. Tire valve. A. B. Norwalk, New York City.
 1,223,345. Tire valve. A. B. Norwalk, New York City.

ISSUED APRIL 24, 1917.

- 1,223,368. Pneumatic arch support. R. S. Carling, Los Angeles, Calif.
 1,223,450. Soft rubber denture. G. L. Van Allen, Prince Bay, N. Y.
 1,223,501. Means for holding demountable rims on wheels. S. R. McKay, Cleveland, Ohio.
 1,223,537. Rubber-faced mat or rug. F. W. Tully, Brookline, Mass.
 1,223,635. Tire rim. H. Stinemetts, The Dalles, Oreg.
 1,223,703. Inkstand with a collapsible air bag. F. La Chapelle, Erie, Pa.
 1,223,716. Tire valve cap. W. Miller, Los Angeles, Calif.
 1,223,724. Pneumatic non-skid tire. F. C. Otto, Worcester, Mass.
 1,223,727. Solid tire. M. C. Overman, New York City.
 1,223,776. Armored pneumatic tire. T. Duysens, Maastricht, Netherlands.
 1,223,788. Combined cushioning and fastening device for solid tires. A. Hauschild, Akron, Ohio.
 1,223,827. Inner tube. E. M. Pearson, Chicago, Ill.
 1,223,863. Ventilated raincoat. S. and F. Freedman, Chelsea, Mass.
 1,223,900. Detachable rim. C. D. Paxson, Cleveland, Ohio.
 1,223,963. Vaginal douche. H. Gollomb, New York City.
 1,224,012. Demountable rim. G. H. Parks, Lomax, Ill.
 1,224,039. Protective mask having elastic strips for attaching. S. Synobuyk, Myrnam, Alberta, Canada.
 1,224,103. Blow-out protector for tires. T. W. Carter, Silver City, N. Mex.

ISSUED MAY 1, 1917.

- 1,224,141. Typewriter device comprising a piece of stretchable material to receive the blows from the keys. J. J. Cohen, New York City.
 1,224,154. Garter with an elastic section. H. J. Esser, New Orleans, La.
 1,224,248. Tire patch. W. I. Waymorn, Lake Norden, S. D.
 1,224,511. Demountable rim and felly band. C. D. Stephens, assignor of one-half to J. A. Bachman—both of Austin, Tex.
 1,224,637. Demountable rim. E. Henry, Albert Lea, Minn.
 1,224,638. Hose coupling. H. H. Howe and C. H. Pearl, Buffalo, N. Y.
 1,224,666. Demountable rim. C. R. Ragsdale, St. Louis, Mo.
 1,224,706. Rim for vehicle wheels. R. S. Bryant, assignor to The Standard Welding Co.—both of Cleveland, Ohio.
 1,224,758. Metallic spring-actuated mechanism for rubber tires. E. G. Loeser, Roxbury township, Dane county, assignor to Cantilever Airless Tire Co., Milwaukee—both in Wisconsin.
 1,224,803. Tire protector. E. S. Stalker, Hallstead, Pa.
 1,224,830. Vehicle wheel rim. R. W. Ashley, New York City, assignor of one-half to F. Oberkirch, St. Marys, Pa.

ISSUED MAY 8, 1917.

- 1,224,920. Vehicle tire. I. M., N. R. Hass and B. V. Myers, assignor of one-half to I. M. Hass—all of Dayton, Ohio.
 1,224,992. Eraser for attachment to pencils. F. Ziemer, Freeport, N. Y.
 1,225,023. Annular article comprising an inflatable open collar. H. M. Foote, assignor to The Mechanical Rubber Co.—both of Cleveland, Ohio.
 1,225,042. Cushion tire for vehicle wheels. H. M. Lambert, Portland, Oregon, assignor to Lambert Multiplus Co., Phoenix, Ariz.
 1,225,126. Retaining clamp for demountable rims. L. B. Harvey, W. Hornbeck, and B. Bisinger—all of Sacramento, Calif.
 1,225,181. Pneumatic tired vehicle wheel. J. C. Schleicher, Mount Vernon, N. Y.
 1,225,183. Solid resilient tire and wheel. W. D. Seal, Piedmont, Mo.
 1,225,286. Packing comprising a woven metallic fabric embedded in rubber. E. J. Sweetland, Montclair, N. J.
 1,225,341. Surgical device. O. Lederer, Vienna, Austria.
 1,225,344. Pneumatic tire and method of making same. I. S. McGiehan, Mount Vernon, N. Y.

- 1,225,455. Pneumatic shoe sole. R. Marabini, New York City.
 1,225,459. Wheel tire. A. S. Mauk, Orangeville, Md.
 1,225,557. Demountable rim. A. Allgrunn, Dover, N. J.

THE UNITED KINGDOM.

PATENT SPECIFICATIONS PUBLISHED.

In order to give the public the advantage of having abridgments of specifications up to date while retaining their numerical sequence, applications for patents made subsequent to 1915 are given new numbers when their complete specifications are accepted, or become open to public inspection before acceptance. The new numbers start with No. 100,001 (without any indication of date), and supersede the original application numbers in all proceedings after acceptance of the complete specifications.

ISSUED APRIL 4, 1917.

- 17,306 (1915). Emulsifying apparatus comprising an inflatable ring. Maypole Margarine Works, Southall, Middlesex.
 17,357 (1915). Rubber in apparatus for playing a game. F. Uffelmann, "Brooklyn," Tavistock Road, South Woodford, Essex.
 17,449 (1915). Tread band for tires. J. C. Barker, 14 St. Mary Axe, London.
 17,520 (1915). Method of securing rubber soles and heels to boots. J. Walton, 101A Great Western street, Moss Side, Manchester.
 103,570. Tire attachment to rims. Sir W. G. Armstrong & Co., Elswick Works, Newcastle-upon-Tyne, and G. Beveridge, Greenhow Terrace, Scotswood Road, Newcastle-upon-Tyne.
 103,605. Non-skid tire chains. L. P. Reeder, 257 Bay street, Hamilton, Ontario, Canada.
 103,625. Gas cartridge for inflating life belts, pneumatic tires, footballs, india rubber toys, etc. W. G. Brokaw, 41 Boulevard Haussmann, Paris.
 103,642. Patch for tires consisting of a disk of rubber. Marvel Accessories Manufacturing Co., 1220 West Sixth street, Cleveland, Ohio, U. S. A.
 103,660. Pneumatic tire. M. E. J. A. Cuypers, Cuyperstraat, Roermond, Holland.
 103,692. Aircraft device comprising rubber-coated fabric. T. S. Sloper, Devizes, Wiltshire.
 103,694. Pneumatic tire. A. A. Crozier, 3 Woodquest avenue, Herne Hill, London.

ISSUED APRIL 12, 1917.

- 17,675 (1915). Soft rubber nipple shield. H. L. Thomas, 2637 Balacava street, Vancouver, British Columbia, Canada.
 17,779 (1915). Rubber heel with wooden lifts. V. Buckland, British Wood Heel Co., Windmill Road, West Croydon, Surrey.
 17,795 (1915). Non-skid tread for twin tires. Schneider et Cie, 42 Rue d'Anjou, Paris.
 17,826 (1915). Inflatable life saving apparatus. T. Ingaramo, 31 Via XX Settembre, Genoa, Italy.
 103,715. Dies for marking shells supported by rubber rings. J. R. Hancock, 4 Fairview avenue, Cleethorpes, Grimsby, Lincolnshire.
 103,727. Pneumatic tire with sectional inner tubes. H. F. Norman, 5 Upper Ormond Quay, Dublin.
 103,755. Toys or game apparatus with vulcanite projectile. C. E. Evans, 37 Wynne Road, St. Helens, Lancashire.
 103,762. Rubber tooth brush. C. E. Evans, 37 Wynne Road, St. Helens, Lancashire.
 103,811. Golf balls. St. Mungo Manufacturing Co., 121 Sylvan avenue, Newark, New Jersey, U. S. A.

ISSUED APRIL 18, 1917.

- 7,932 (1915). Respiratory appliance. R. Donald, 39 Parliament Hill Mansions, Highgate Road, London.
 10,338 (1915). Wheel tire and its attachment. F. A. Lake, 2000 Thornie Road, and P. A. Jones, Cotton Road—both in Wolverhampton.
 17,908 (1915). Compound fabric for containers. J. Peterson, 50 Union Square North, New York City, U. S. A.
 17,976 (1915). Clock case in which the glass is held against the rim by a toothed rubber annulus. A. Mond, 19 Southampton Buildings, Chancery Lane, London.
 18,101 (1915). Wire tread band for tires. L. R. Poschadel, 193 Garfield avenue, Milwaukee, Wisconsin, U. S. A.
 18,170 (1915). Spring wheel with rubber tire. C. A. Jones, 1000 Terrace, Rose Park, and F. F. Milford, Portrush Road, Toorak—both in South Australia.
 103,864. Soft rubber ear plugs. S. N. Pinkus, 42 Marszalkowska, Warsaw, Russia, and R. Lake, 62 Bickenhall Mansions, London.
 103,868. Wheel tire and its attachment. F. A. Lake, 2000 Thornie Road, and P. A. Jones, Cotton Road—both in Wolverhampton.
 103,869. Rubber valve head. T. Sloper, Southgate, Devizes, Wiltshire.
 103,883. Polishing disk consisting of a solution of rubber mixed with emery powder. J. R. Cooper, 46 Hatfield Road, Birchfield, Birmingham.
 103,895. Rubber insets for billiard pocket plates. C. Kirton, "Curlew," 1000 Terrace, Rose Park, and F. F. Milford, Portrush Road, Toorak—both in South Australia.

- 103,901. Gas mask comprising sheet rubber and rubber attaching bands. R. L. Gravercaux and C. Martin, 17 Rue des Jeuneurs, Paris, France.

ISSUED APRIL 25, 1917.

- 103,966. Fountain pen cap. W. A. Wilkinson, 130 Court street, Blaenclwyd, Rhondda, Glamorganshire.
 104,076. Rubber-faced motorcycle driving belt. G. Warwick, 80 Cobham Road, Seven Kings, Essex, and A. P. Crouch, 106 Cannon street, London.
 104,110. Divers' glove and means of attachment. R. H. Davis, 187 Westminster Bridge Road, London.
 104,111. Divers' glove and means of attachment. R. H. Davis, 187 Westminster Bridge Road, London.

ISSUED MAY 2, 1917.

- 104,175. Anti-skid device for wheel tires. A. J. Heinsius, Pittsburgh, Pennsylvania, U. S. A.
 104,192. Rubber roller and cushions for hat polishing machine. F. Webb, Lancet's Path, Alma street, and M. White, 22 Belmont Road—both in Luton, Bedfordshire.
 104,205. Vehicle wheel carrying a rubber tire. W. J. P. Moore, 629 West One Hundred and Fifteenth street, New York City, U. S. A.
 104,227. Rubber crutch tip and method of attachment. H. Crudgington, Blenheim House, Alcester Road, King's Heath, Birmingham.
 104,273. Rubber life-saving belt. F. P. Ingram, Fairlight, Chigwell Row, Essex.
 104,283. Leather tread band and chain for rubber tires. W. H. Gahan, General Delivery, Los Angeles, California, U. S. A.
 104,287. Divers' collar and attaching means. R. H. Davis, 187 Westminster Bridge Road, London.
 104,300. Rubber strip for aperture, closing plugs for ship, etc. G. Ferguson, care General Post Office, London, and J. R. Campbell, 175 West George street, Glasgow.
 104,309. Apparatus for detecting punctures in air tubes. T. Dunnery, the Workhouse, Cavan, Ireland.
 104,314. Rubber-tired vehicle. W. J. P. Moore, 629 West 115th street, New York City, U. S. A.
 104,323. India rubber. G. M. Thomas, and M. D. Maude, Cicely Estate, Teluk Anson, Perak, F. M. S.
 104,325. Stopper for hot-water bottles. F. C. Jones, 24 Belvedere Road, Upper Norwood, London.
 104,360. Suctions for the dentures of artificial teeth. H. M. Parsons, 46 Follywell street, Blackburn.
 104,373. Elastic wheel tire. S. Johnstone, Corunna, Ontario, Canada.
 104,401. Rubber covered flexible electric cables. British Insulated & Helsby Cables, Helsby, and E. A. Bayles, The Oaks, Helsby—both in Cheshire.
 104,452. Life-saving suit. O. A. Youngren, 730 North Main street, Sheridan, Wyoming, U. S. A.
 104,473. Inflatable bags contained in pockets of life-saving suits. W. G. Brokaw, 41 Boulevard Haussmann, Paris, France.
 104,476. Fountain pen. A. E. White, 88 Chancery Lane, London.
 104,477. Dress shields. W. J. Taylor, Wimmera Lodge, Salisbury Road, Walthamstow, Essex.

THE DOMINION OF CANADA.

ISSUED JANUARY 31, 1917.

- 174,276. Cushion tire. E. B. Killen, London, E. C., England.
 174,291. Cushion tire. E. J. Mitchell, New York City, U. S. A.
 174,300. Wheel rim. D. H. Shapiro, Montreal, Quebec.
 174,323. Air hose couplings. L. C. Bonnelle and J. F. Lazano & Co., assignee of sixty-five one hundredths of the interest—both of San Antonio, Texas, U. S. A.
 174,330. Packing washers for caps or the like. A. Schrader's Son, Inc., New York City, assignee of H. P. Kraft, Ridgewood, New Jersey—both in U. S. A.
 174,334. Golf ball. The St. Mungo Manufacturing Co. of America, Newark, assignee of W. R. Knight, Belleville—both in New Jersey, U. S. A.
 174,335. Golf ball. The St. Mungo Manufacturing Co. of America, Newark, assignee of W. R. Knight, Belleville—both in New Jersey, U. S. A.
 174,347. Fountain pen. J. Familet and A. Brochetti, co-inventors—both of Dunkirk, New York, U. S. A.
 174,362. Rubber heel. E. J. Emery, Portsmouth, New Hampshire, U. S. A.
 174,367. Sectional cushion tire. J. T. Fitch, Helper, Utah, U. S. A.
 174,407. Fountain pen. J. I. Schnell, Arlington, New Jersey, U. S. A.
 174,411. Fountain pen. T. Tanamura, Rock Springs, Wyoming, U. S. A.
 174,438. Feed bar for fountain pens. The L. E. Waterman Co., Ltd., Montreal, Quebec, assignee of W. I. Ferris, Westfield, New Jersey, U. S. A.
 174,562. Tire armor. H. M. Hillman and J. Schwab—both of Winnipeg, Manitoba.
 174,624. Breast pump. J. F. McCleary, Findlay, Ohio, U. S. A.
 174,631. Pneumatic tire. J. B. Salmon, Dunedin, New Zealand.
 174,707. Tire valve stem. G. Hughes and D. F. Givens—both of Syracuse, New York, U. S. A.
 174,738. Cane handle comprising an air forcing bulb. S. E. Holdzkorn, Longport, New Jersey, U. S. A.
 174,740. Combination spring and solid tire. I. James, Scranton, Pennsylvania, U. S. A.
 174,794. Closet seat comprising a solid core of hard rubber compound. The Brunswick-Balke-Collender Co. of Canada, Limited, Toronto, Ontario, assignee of M. J. Whelan, Muskegon, Michigan, U. S. A.
 174,795. Closet seat comprising a wooden core and a veneer of rubber. The Brunswick-Balke-Collender Co. of Canada, Limited, Toronto, Ontario, assignee of M. J. Whelan, Muskegon, Michigan, U. S. A.
 174,796. Closet seat having a wood core and a covering of hard rubber vulcanized thereto. The Brunswick-Balke-Collender Co. of Canada, Limited, Toronto, Ontario, assignee of M. J. Whelan, Muskegon, Michigan, U. S. A.

- 174,804. Shoe sole consisting of a rubber binder and wool fibers. The Canadian Consolidated Rubber Co., Limited, assignee of T. H. Rieder, and W. B. Wiegand—all of Montreal, Quebec.

THE FRENCH REPUBLIC.

PATENTS ISSUED (WITH DATES OF APPLICATION).

- 482,024 (June 14, 1916). Improvements in composition soles. T. C. Redfern.
 482,137 (June 26, 1916). Elastic wheel for all vehicles and airplanes. E. L. André.
 482,162 (June 29, 1916). Improvements in pipe-stems. Traun Rubber Co.
 482,183 (July 3, 1916). Improvements in tires for wheels and vehicles. W. F. Stewart.
 482,216 (June 10, 1916). Special pneumatic mattress. L. Malinge.
 482,253 (July 12, 1916). Joint for water and steam conduits. J. M. Bigot.
 482,259 (July 10, 1916). Solid rubber tire with fixed tread. N. N. Munoz.
 482,306 (July 21, 1916). Improvements in tire protectors. W. H. Gahan.

AUSTRALIA.

SPECIFICATIONS ACCEPTED (WITH DATES OF APPLICATION).

- 2,795 December 13, 1916). Pneumatic tire. J. C. Barker, England.
 2,998 (January 15, 1917). Resilient tire. A. A. Crozier, England.
 2,999 (January 15, 1917). Resilient tire. A. A. Crozier, England.

NEW ZEALAND.

- 38,384. Conveyer-belt having rubber layers. W. F. Bowers, 3196 Pacific avenue, San Francisco, California, U. S. A.

TRADE-MARKS.

THE UNITED STATES.

- 98,228. The word METRIC—machinery made of rubber and other materials. Metric Packing Co., Buffalo, N. Y.
 9,387. The word VULPA—adhesive vulcanizing patches and adhesive vulcanizing fabrics. W. F. Spencer, New York City.
 100,317. Representation of a man's face in two styles of shoe soles, one showing him in tears, the other smiling—rubber and other boots, shoes, etc. C. Schneitz, Jacksonville, Fla.
 100,544. Representation of several tires across which appear the words Lox-It-Tite—tire repairing cement. G. K. Cogswell, Hutchinson, Kans.
 100,527. Representation of frog in rainstorm wearing a waterproof coat—waterproof coats, slickers, jackets, pants, hats, aprons and ponchos. H. M. Sawyer & Son, East Cambridge, Mass.
 101,116. The word CHASE—artificial leather with rubber surface coating. L. C. Chase & Co., Boston, Mass.
 101,261. The word NUGGETS—chewing gum. Common Sense Gum Co., New York City.
 92,087. The words RED SQUARE within a red square—rubber roofing. C. T. Overton, Towanda, Pa.
 94,848. The words GOLDEN KING—golf balls. The Worthington Ball Co., Elyria, Ohio.
 102,270. The word IDEAL—rubber brushes for bottle-washing machines. The S. S. Wenzell Machine Co., Philadelphia, Pa.
 102,913. The word STORK—rubber nipples, baby comforters or pacifiers, and babies' nursing-bottles. The Stork Co., Boston, Mass.

THE UNITED KINGDOM.

- 375,057. The word BEAVER—engine and machine packings, jointings and hose. The Beldam Packing & Rubber Co., Limited, 1 and 2 Gracechurch street, London, E. C.
 376,969. The word KRYLEX—all goods included in Class 40. Peerless Seamless Rubber Co., Limited, Richmond, Surrey.
 376,751. The word EXPRESS—rubber teats for feeding bottles. J. G. Franklin & Sons, Limited, 17 Colvestone Crescent, Dalston, London, E. S.
 377,244. The word GEM—machines for treating crude and partly prepared india rubber. Summerscales, Limited, Phoenix Foundry, Royal Lane, Beechcliffe, and Coney Lane Works, Coney Lane—both in Keighley, Yorkshire.
 377,190. The word EXPRESS—hair combs. The North British Rubber Co., Limited, Castle Mills, Fountainbridge, Edinburgh, Scotland.
 376,476. Representation of a seal in an arctic scene, surrounded by a design bearing the words SEAL BRAND and a shield with the letters H S intertwined—elastic suspenders. H. Seal, 3 Red Cross street, Leicester.
 376,342. The word TUFFITE—substance in sheet form composed of india rubber and textile and other materials, the india rubber predominating. G. MacLellan & Co., Glasgow Rubber Works, 125 Shuna street, Maryhill, Glasgow.

THE DOMINION OF CANADA.

- 22,245. The word RAYNSTER—rubber coats. Canadian Consolidated Rubber Co., Limited, Montreal, Quebec.
 22,246. The word KEDS—rubbershoes. Canadian Consolidated Rubber Co., Limited, Montreal, Quebec.
 22,255. The words GOPHER BRAND and the representation of a gopher sitting erect on the prairie—inner tubes for automobiles. The Motor Supply Co., Limited, Calgary, Alberta.
 22,262. The words BRITISH PROOFED AQUAPROOF RAINCOAT across the face of a rectangle—raincoats and clothing. Alfred B. Rosenblatt & Co., Toronto, Ontario.
 22,277. The word RAINBOW enclosed in a diamond shaped figure—machinery packing composed of rubber. Canadian Consolidated Rubber Co., Limited, Montreal, Quebec.
 22,292. The word COLONEL—india rubber and eraser materials, all being articles of stationery. St. Mungo Manufacturing Co., Limited, Glasgow, Scotland.

AUSTRALIA.

- 21,149. The word COLON—All kinds of stationery, pens included. St. Mungo Manufacturing Co., Limited, Glasgow, Scotland.

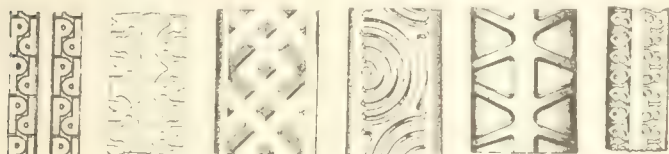
NEW ZEALAND.

- 13,442. A design comprising the name and address of the manufacturer and the date 1891—goloshes, cloth shoes having rubber soles, and snow boots. Helsingborgs Gummitfabriks Aktiebolag, of Fumtorpogatan, Block Nos. 1-2-14-15-16-17 Helsingborg, Sweden.
- 13,522. A continuous red band constituting the tread portion of a gray rubber tire—rubber tires. The Fisk Rubber Co., New York, Chicopee Falls, Massachusetts, U. S. A.
- 13,740. The word COLON—erasers. St. Mungo Manufacturing Co., Limited, Glasgow, Scotland.

DESIGNS FOR TIRES.

THE UNITED STATES.

- 50,567. Non-skid tread. Term 14 years. J. D. Kline, assignor of one-half to C. A. Barnholth—both of Akron, Ohio.
- 50,644. Tread for an automobile tire. Term 14 years. H. S. Blynt, Binghamton, N. Y.
- 50,655. Tread for rubber tires. Term 3½ years. G. P. Herrick, New York City.



50,567 50,644 50,655 50,673 50,681 50,769

- 50,673. Tire tread. Term 7 years. S. S. Adams, Lafayette, Tenn.
- 50,681. Tire tread. Term 14 years. J. S. Broughton, assignor to United & Globe Rubber Manufacturing Cos.—both of Trenton, N. J.
- 50,769. Tread for automobile tires. Term 14 years. E. Von Virgyas, Washington, D. C., assignor of sixty one-hundredths to J. J. Vavora, Binghamton, N. Y.

DESIGNS.

THE UNITED STATES.

- 50,652. Rubber ball. Term 14 years. R. C. Eddy, Milwaukee, Wis.
- 50,701. Rubber ball. Term 14 years. M. P. O'Neil, assignor to O'Neil, Inc.—both of New York City.

RUBBER REPLACING LEATHER IN BELTING.

THE present high cost of leather suitable for belting is proving most advantageous for manufacturers of rubber belting. A comparison of net cost per foot in Canada, given by J. M. S. Carroll, sales manager of the Canadian Consolidated Rubber Co., Limited, is quoted here:

	Net Cost Per Foot.	
	Leather.	Rubber.
12-inch Double	\$3.44	\$1.92
12-inch Single	1.72	1.45
8-inch Double	2.28	1.14
8-inch Single	1.14	.65
4-inch Double	1.14	.51
4-inch Single .....	.57	.34

Mr. Carroll predicts that leather prices will not drop to ante-bellum quotations for a long time and meanwhile a golden opportunity is presented for greatly increasing the sales of rubber belting.

WHY NOT NAME THE COMPANY?

"LE CAOUTCHOUC & LA GUTTA-PERCHA" claims that Germans have established in the United States a big factory for those rubber specialties so largely supplied by Germany before the war. It seems that these goods are sent to Paris, where agents, generally naturalized French or British subjects, but of Austrian and German birth, distribute them throughout France and the neutral countries, whence they usually find their way into Germany.

The journal declares that these proceedings should be stopped by prohibiting the importation of rubber manufactures, adding that the home industry is fully capable of supplying not only France but also the neighboring neutral countries.

After having encouraged Frenchmen to take up the new industry, it would be a piece of bitter irony on the part of the Government to allow Germans, acting as American or Swiss firms, to oust them through successful competition.

LA BELLE MINERAL RUBBER.

It will be recalled by some in the rubber trade that some years ago a gentleman in the Middle West named La Belle announced that by means of certain treatment he was able to compound and vulcanize mineral rubber ("Elaterite," "Tabbyite," "Gilsonite," etc.) so that it showed a high degree of resilience, and this without the addition of any vegetable rubber. Mr. La Belle, who was an educated man of high standing, died without making arrangements with anyone to utilize his discovery. He, however, left all of his formulas in the hands of his widow who has lately made up some pounds of his compounds.

Of course, if "Elaterite" could be given resilience it would be of great value to the whole trade. That Mr. La Belle succeeded in adding this desirable quality, and that he did not add a particle of vegetable rubber, nor indeed have any in his laboratory, Mrs. La Belle is absolutely convinced. Mrs. La Belle has handed THE INDIA RUBBER WORLD samples compounded for vulcanization, and in the event that the results coincide with those attained by the inventor, the rubber trade will be duly notified.

THE WEBB BILL TO PROMOTE EXPORT TRADE.

A matter of but little less importance as a commercial preparedness measure than securing an immediate and adequate supply of raw materials, including rubber, at fair prices is that of solving the problems which will beset export trade from this country following the war. This can be accomplished by passage of the Webb bill at the present extraordinary session of Congress. As reintroduced in the House of Representatives and favorably reported from the judiciary committee, this bill would bring unfair methods of competition in export trade within the jurisdiction of the Federal Trade Commission with power to investigate the existence of agreements, understandings or conspiracies to enhance prices artificially or intentionally and unduly, and to make recommendations for readjustment to the firms involved or to the Attorney General of the United States for action should the undesirable practices continue. All export firms would be required to file an annual statement of organization, business, conduct, practices, management, and relation to other associations, corporations, partnerships and individuals.

THE LYONS FAIR, 1917.

The Lyons Fair, held from March 18 to April 1 under the patronage of the French Government and with the support of 40 chambers of commerce, was a great success. This year 2,526 exhibitors were accommodated in 2,320 stands, as compared with 1,342 exhibitors in 912 stands at the fair of 1916. The nations represented in their numerical order were France, Switzerland, Italy, England, America, Portugal, Spain, Holland, Russia, Belgium, Japan, China and Sweden. There was a total of 99 exhibitors of automobiles, cycles, carriages and tires, 36 exhibitors of engineering sundries, belting, solder, gearing, fire extinguishing apparatus and the like, and 48 exhibitors of footwear. Whereas only two American firms were represented in 1916, 25 exhibited this year, and in the stand rented by the United States Consulate numerous catalogs of American manufacturers were on view with satisfactory results.

AMERICAN RUBBER GOODS IN AUSTRALIA.

Imports of American rubber goods in Australia show a great increase. For 1915-16 the total imports of rubber articles amounted to £940,000, of which more than half—£480,000—came from the United States.

Rubber exports from the Congo Free State amounted to 2,311,300 pounds in the first six months of 1916.

Review of the Crude Rubber Market.

Copyright 1917.

NEW YORK.

THE feature of the market for the past month has been the demand for spot and nearby rubber of all grades and sorts. The volume of business transacted has been large in some quarters, while in others very little has been doing. Sellers who were able to make prompt deliveries have had no trouble in disposing of their holdings. Inquiries for futures have been noticeably frequent but actual buying was negligible, due to the tendency on the part of consumers to await lower prices. The shipping situation is becoming more complicated, and freight rates have again advanced. Ocean charges are increasing to such an extent that 15 cents a pound for Far Eastern shipments is not at all improbable.

Plantation prices have been generally steady with slight changes during the month, the tendency being upward. On May 1 First latex and Smoked sheet ribbed spot were 81½ cents; July-December for both grades was quoted 77 cents. The prospect of a war tax stimulated the market somewhat and on May 15 First latex and Smoked sheet ribbed spot were 85 cents and July-December for both grades was 79½ cents. During the last two weeks the market eased off as the buying interest relaxed and on May 26 First latex and Smoked sheet ribbed spot were 83 cents and July-December for these grades was 78 cents.

Spot Paras have been in demand, Upriver fine selling at 76 cents on May 26, a gain of 2 cents during the month. Upriver coarse has been especially strong, the price of 54 cents on May 26 being considered unusually high. This grade has advanced about 2½ cents during the month. Centrals have been going well at higher prices and spot stocks are very small. Centrals are now higher in price than Caucho ball. The call for Africans, particularly spot and near by, has been no exception to the demand for all grades of nearby rubber.

During the fiscal year ending June 30, 1916, 56,000 tons of plantation rubber were imported into the United States from the Far East, the average being 4,676 tons a month and we have consumed every pound. Now the eastern shipping situation threatens to curtail this important source of supply, and, moreover, Singapore shippers are beset with new difficulties in securing permits, while the exchange question continues to grow more serious. That the able committees of The Rubber Association of America, now working energetically to insure a constant supply of crude rubber will be successful is confidently expected.

LONDON.

Early in the month trading was brisk on all grades and forward sales were freely reported. Standard crêpe spot was going well at 37d. on May 1 and Smoked sheet spot sold at 36¾d. Forward sales of the standard grades were made at 36¾d. The market continued fairly active with particular attention centered on May-June arrivals that were quoted at relatively higher prices than spot rubber. Prices remained fairly steady during the balance of the month that was characterized by quiet conditions almost approaching dullness. The spot quotations on May 26 were: Standard crêpe, 36½d., and Smoked sheet ribbed, 36½d.

The report that British ships have been taken off the Far Eastern run, leaving rubber cargoes to Japanese and Norwegian carriers, has caused considerable comment.

London imports for March were 6,562 tons, compared to 4,748 for February. Reexports were 2,827 tons, compared to 5,043 tons for February. Liverpool imports for March were 2,218 tons, compared to 2,410 tons for February. Reexports were 1,232 tons, compared to 1,331 tons for February.

SINGAPORE.

The inability to secure adequate cargo space threatens this source of America's greatest rubber supply. Shipping permits are curtailed or canceled for preferred cargo allotments. The difficulties in negotiating drafts are becoming more apparent and this constitutes a serious menace to this market. Exporters are looking hopefully for relief of some sort from American consumers.

The Singapore cables indicate a dull market with small demand. At the auctions held April 28, May 5, 11, 18 and 25, the following average prices were obtained: First latex crêpe and Smoked sheet ribbed 65.36 cents, compared to 68.9 cents last month. The total quantity sold was 2,618 tons compared to 2,105 tons last month.

NEW YORK SPOT QUOTATIONS.

PLANTATION PARAS—	June 1, 1916.	May 1, 1917.	May 28, 1917.
First latex crêpe			83 @
*Hevea first crêpe			80 @
Amber crêpe, light glossy			79 @
Amber crêpe, dark		78 @	79 @
Brown crêpe, thick clean			77 @
Brown crêpe, thin clean, light mottled		78 @ 79	80 @
Brown crêpe, thin clean	63 @	77½ @ 78½	78 @
Brown crêpe, thin speckled			73 @
Brown crêpe, thin black			70 @
Brown crêpe, thick speckled			65 @
Smoked sheet ribbed standard quality			83 @
*Hevea ribbed smoked sheets			81 @
Smoked sheet, plant. standard quality			
*Hevea plant. standard quality sheets			
Unsmoked sheet, standard quality		79½ @	79½ @
*Hevea unsmoked sheets			
Singapore scrap, No. 1		60 @	60 @
Singapore scrap, No. 2		55 @	55 @
Colombo scrap, No. 1		62 @	62 @
Colombo scrap, No. 2		58 @	58 @
BRAZILIAN PARAS—			
Upriver fine	65 @	75 @	76 @
Upriver medium		69 @	69 @
Upriver coarse			54 @
Central fine			53 @
Central medium			51 @
Central coarse			50 @
Islands fine	59 @ 60	72 @	73 @
Islands medium		65 @	65 @
Islands coarse	30 @	34 @	35 @
Islands weak fine		54 @	55 @
Cameta	35 @	37 @	38 @
Lower caucho ball	45 @	45 @	46 @
Proximo			52 @
Tubo			53 @
AFRICANS—			
Acacia flake			31 @
Niger flake	37 @	29 @ 30	31 @
Benguela, extra seconds, 28%		42 @	41 @
Benguela, No. 2, 32½%		38 @	38 @
Benguela, No. 3, 40%		33 @	33 @
Camero crêpe, black upper		74 @	74 @
Camero crêpe, black lower		54 @	57 @
Rio Nunez ball		66 @	66 @
Rio Nunez sheets and strings		66 @	66 @
Conakry niggers	61 @ 62	66 @	64 @
Mossai sheets and strings		66 @	64 @
CENTRALS—			
Esmeralda sausage	44 @	52 @ 53	52 @ 53
Central scrap		51 @ 52	51 @ 52
Central scrap and strip	40 @ 42	48 @ 49	50 @ 51
Central wet sheet	35 @	35 @	36 @
Guayule	39 @	30 @ 45	30 @ 45
MANICOBAS—			
Ceara scrap		38 @	39 @
Ceara negro heads		49 @	40 @
Manicoba special	45 @	42½ @	42 @
Manicoba extra		35 @	37½ @ 38
Manicoba regular			32 @
Manicoba thin sheet			40½ @ 41
Manicoba thick sheet	32 @		33 @
ITALIANS—			
Balata block		57 @ 70	54 @ 68
Surinam sheet	70 @ 70½	90 @ 98	95 @
EAST INDIAN—			
Assam crêpe	44 @		74 @ 76
Assam on the			74 @ 71
Penang block scrap		52 @	50 @ 52
Pontanak pressed		20 @	20 @
Panthermassen			16 @ 18
Gutta percha, red Macassar	1.50 @ 2.00	2.20 @	2.20 @ 3.00

* Rubber Association of America nomenclature.

COMPARATIVE NEW YORK PRICES FOR MAY.

In regard to the financial situation, Albert B. Beers (broker in crude rubber and commercial paper, No. 68 William street, New York) advises as follows:

"As reported at the end of April, a considerable change came over the general money market, and the demand for paper fell off materially with an advance in rates, and these conditions have continued through May, the general demand for paper being light, with 5 to 5½ per cent quoted for the best rubber names and 6 per cent for those not so well known."

	1915.	1916.	1917.
Upper, 1st	66.72	67.15	66.72
Upper, 2nd	65.45	65.45	65.45
Island, 1st	63.32	63.32	63.32
Island, 2nd	62.54	62.54	62.54
Caneta	61.76	61.76	61.76

* Figured only for May.

MARKET CABLE SERVICE FROM SINGAPORE.

Date.	Crêpe price per lb.	Smoked sheet price per lb.	Tons sold.	Market.
April 28	66.72	67.15	462	Dull market.
May 5	66.72	66.30	462	Very dull.
May 11	65.45	65.45	483	Market continues dull.
May 18	63.32	63.32	454	Weaker; less demand.
May 25	64.60	64.60	683	There is more demand.

MARKET CABLE SERVICE FROM LONDON.

The following market report has been cabled from Aldens' Successors, Limited, London.

	Standard Crêpe.	Ribbed Smoked Sheets.	Market.
April 24	35¾d.	35¾d.	Buyers.
April 30	37d.	37d.	Buyers.
May 7	36½d.	36½d.	Buyers.
May 14	36½d.	36½d.	Buyers.
May 21	36¾d.	36¾d.	Buyers.

WEEKLY RUBBER REPORT.

GUTHRIE & CO., LIMITED, Singapore, report [April 5, 1917]:

At the weekly rubber auction which commenced yesterday, there was a good demand for all grades, at about last week's prices for first latex rubber and slightly improved prices for lower grades. At the continuation of the sale today, prices for the leading grades advanced by \$4 per picul in the case of ribbed smoked sheet and \$1 in the case of fine pale crêpe, and the prices of lower grades also shared an improvement. The top price of the sale for ribbed smoked sheet was \$164 per picul, paid for one lot only, this being \$3 above last week's best. Fine pale crêpe fetched up to \$162, an advance of \$2. Unsmoked sheet received more attention than usual, and brown and good dark crêpes were a strong market. Of 762 tons catalogued, 567 tons were sold.

The following was the course of values:

	In Singapore per picul.*	Sterling equivalent per pound in London.	Equivalent per pound in cents.
Sheet, fine ribbed smoked	\$155@164	3/ 0½ @ 3/ 2½	65.87 @ 69.70
Sheet, good ribbed sm	140@150	2/ 6½ @ 2/ 9½	53.12 @ 59.07
Sheet, plain smoked	125@139	2/ 7¼ @ 2/ 10¼	55.25 @ 61.20
Sheet, ribbed unsmoked	130@144	2/ 7¼ @ 2/ 10¼	55.25 @ 61.20
Sheet, plain unsmoked	108@114	2/ 6½ @ 2/ 9½	53.12 @ 59.07
Crêpe, fine pale	158@162	3/ 4½ @ 3/ 2	67.15 @ 68.85
Crêpe, good pale	140@150	2/ 6½ @ 2/ 9½	53.12 @ 59.07
Crêpe, fine brown	136@152	2/ 8½ @ 2/ 11½	57.80 @ 64.60
Crêpe, good brown	110@135	2/ 6½ @ 2/ 9½	53.12 @ 59.07
Crêpe, dark	60@113	1/ 11½ @ 1/ 14½	47.81 @ 54.61
Crêpe, baky	68@103	1/ 11½ @ 1/ 14½	47.81 @ 54.61
Scrap, virgin and pressed	70@ 89	1/ 6½ @ 1/ 10½	29.75 @ 37.82
Scrap, loose	70@ 80	1/ 6½ @ 1/ 8¾	29.75 @ 34.00

* Picul = 133 pounds.

Quoted in S. S. dollars = 2½ [567 cents]

COMPARATIVE SINGAPORE RUBBER PRICES.

	1913.	1914.	1915.	First Half.	Second Half.
Sheet smoked fine ribbed	\$1.06	\$0.60	\$0.87	\$0.86	\$0.70
Sheet smoked good ribbed	1.06	0.57	0.80	0.82	0.67
Sheet smoked fine plain	1.06	0.56	0.79	0.82	0.62
Sheet smoked good plain	1.06	0.54	0.78	0.80	0.59
Sheet unsmoked fine ribbed	1.01	0.55	0.77	0.81	0.62
Sheet unsmoked good ribbed	1.01	0.55	0.76	0.71	0.58
Sheet unsmoked fine plain	1.01	0.55	0.765	0.81	0.59
Sheet unsmoked good plain	1.01	0.54	0.72	0.79	0.56
Crêpe fine pale thin	1.04	0.62	0.89	0.89	0.70
Crêpe good pale thin	1.04	0.59	0.84	0.87	0.55
Crêpe good pale blanket	0.94	0.56	0.81	0.84	0.62
Crêpe good brown blanket	0.94	0.56	0.78	0.82	0.62
Crêpe fine brown	0.94	0.56	0.81	0.84	0.62
Crêpe good brown	0.94	0.53	0.76	0.80	0.59
Crêpe good dark	0.81	0.52	0.73	0.76	0.55
Crêpe baky	0.765	0.47	0.67	0.73	0.52
Scrap, virgin and pressed	0.85	0.46	0.51	0.47	0.53
Scrap, loose	0.79	0.41	0.54	0.47	0.48

(Continued from Singapore Rubber Report, June 1, 1917, p. 557.)

IMPORTS AND EXPORTS OF RUBBER AND GUTTA AT SINGAPORE.

IMPORTS.

March, 1917.

	Para Rubber.	Trans-shipped Rubber.	Gutta Percha.	Gutta Jelutong.
From				
Malaya	1,106,133			
Port of London				
Kelantan				
Kuantan				
Rebong				
Mersing				
S. Penang				
Timor				

	Para Rubber.	Trans-shipped Rubber.	Gutta Percha.	Gutta Jelutong.
From				
Sarawak	1,400	5,866	21,370	403,069
Pontianak	93,733	6,800	7,333	12,400
Bandar Abbas	191,599		9,199	27,466
Sambas	50,400			193,466
Less Item	44,000	196,533		133
Sibu	36,933			8,800
Lahar	34,666			4,000
Sandakan	18,533	32,400		32,400
Singawang	20,066			
Samarinda	3,733			13,333
Kudat	3,600	26,400		
Pasir	9,199			4,266
Santol				2,000

Totals	650,961	267,999	18,130	99,234
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Sumatra -				
Djambi	340,666			
Deli	63,733	465,066		
Palembang	53,466			85,066
Indragiri	37,600	6,990		8,000
Sib	12,933			
Belawan	6,666	51,066		
Bengkalis	3,733			
Muruk	3,600			
Asahan				
Totals	487		533	93,066

Java				
Sourabaya	7,600			
Batavia	4,000			
Samarang				
Totals	11,600			

From				
Rubber				
State				
India				
Peru			7,600	
Totals			7,600	
Other ports		122,770	4,932	168,266
Grand Totals	9,500,638	2,162,556	23,062	277,766

EXPORTS

March, 1917.

To—	Para Rubber.	Trans-shipped Rubber.	Borneo Rubber.	Gutta Percha.	Gutta Jelutong.
United States—					
New York	4,000,000	691,866			
Akron	817,733	82,933			
Seattle	1,153,000	122,000		287,200	
San Francisco	20,000	77,333			59,800
Boston	157,866				
Canada—					
Vancouver	2,008,666				
Toronto	442,533				
Montreal	168,133				
Totals	8,857,530	974,132			
EUROPE:					
United Kingdom—					
England—					
Liverpool	583,533	583,199		106,133	
London	308,000	15,000			
Russia (Vladivostok)	3,384,537				
France (Marseilles)	223,733		2,266		
Totals	4,450,468	742,265	2,266	128,533	
Grand Totals	13,307,998	1,716,397	266	426,933	54,800

PLANTATION RUBBER FROM THE FAR EAST.

TOTAL EXPORTS FROM MALAYA.

(Figures for the month of March, 1917, are preliminary and subject to final adjustments. Reported by Barlow & Co., Singapore.)

	From				
	Singapore. February 28, 1917.	Malacca. February 28, 1917.	Penang. February 28, 1917.	Port-Swet- tenham. March 10, 1917.	Totals.
United Kingdom	10,245,489	1,102,142	6,640,667	7,457,298	25,445,596
The Continent	515,453		47,067		562,520
Japan					607,994
Ceylon	152,334		117,733	195,945	466,012
United States	15,972,284		2,317,733	523,024	18,812,041
Australia	9,933				9,933
Total	27,503,487	1,102,142	9,123,200	8,176,267	45,904,096
Same period, 1915...	21,813,702	931,200	5,946,267	6,861,912	35,553,081
Same period, 1914...	10,084,539	1,385,559	4,135,865	6,881,494	22,487,457
Same period, 1913...	6,021,559		3,717,200	6,361,645	16,100,404

STRAITS SETTLEMENTS RUBBER EXPORTS.

The export of plantation rubber from Straits Settlements ports in the month of March, as reported officially by cablegram from Singapore, amounted to 8,299 tons, the highest figure yet recorded for one month's shipments. This compares with 6,495 tons in February last and 4,481 tons in March, 1916, and brings the first quarter's shipments up to 18,356 tons compared with 12,283 tons for the corresponding period last year. Of the March total, 954 tons were transshipments from adjacent countries. Appended are the comparative statistics for three years:

	1915	1916	1917.
January	4,443	4,443	3,562
February	2,741	3,359	6,495
March	2,477	4,481	8,299
Totals	7,794	12,283	18,356

The above figures include transshipments of rubber from various places in the neighborhood of the Straits Settlements, such as Borneo, Java, Sumatra and the Malay States other than the Federated Malay States.

EXPORTS OF RUBBER FROM PENANG.

	March, 1917			
To	Para	India	Borneo	
NORTH AMERICA				
United States—	Rubber.	Rubber.	Rubber.	
New York	2,055,066			
Albany	465,200			
Seattle	46,933			
Canada—				
Vancouver	17,866			
Ottawa	11,200			
Total	2,596,265			
EUROPE				
United Kingdom—				
London	785,899			
Liverpool	99,066			
Total	884,965			

PLANTATIONS.

The following statistics are not complete, due to Government orders prohibiting access to the records:

	Pounds.
General Rubber Co. (London)	342,000
MARCH 10.—By the <i>Port Napier</i> —London:	
General Rubber Co.	113,600
MARCH 18.—By the <i>Saxonia</i> —London:	
General Rubber Co.	59,400
MARCH 24.—By the <i>Siberia Maru</i> —Yokohama:	
Fred Stern & Co.	89,600
Rubber Trading Co.	2,400
MARCH 24.—By the <i>Japan Maru</i> —London:	
General Rubber Co.	62,700
MARCH 24.—By the <i>Japan Maru</i> —Singapore:	
General Rubber Co.	307,900

	Pounds.
MARCH 10.—By the <i>Port Napier</i> —London:	
General Rubber Co.	146,000
MARCH 18.—By the <i>Saxonia</i> —London:	
General Rubber Co.	226,900
MARCH 24.—By the <i>Siberia Maru</i> —Yokohama:	
General Rubber Co.	196,400
MARCH 24.—By the <i>Japan Maru</i> —London:	
General Rubber Co.	489,600
MARCH 24.—By the <i>Japan Maru</i> —Hongkong:	
General Rubber Co.	67,200
MARCH 24.—By the <i>Manhattan</i> —London:	
General Rubber Co.	114,300
MARCH 24.—By the <i>Ansonia</i> —London:	
General Rubber Co.	230,100
MARCH 24.—By the <i>Carmania</i> —Liverpool:	
General Rubber Co.	78,000
MARCH 24.—By the <i>Bankoku Maru</i> —Singapore:	
General Rubber Co.	105,300
Fred. Stern & Co.	17,920

	Pounds.
MARCH 10.—By the <i>Port Napier</i> —London:	
Meyer & Brown	10,400
General Rubber Co.	113,900
L. Littlejohn & Co.	239,680
MARCH 18.—By the <i>Saxonia</i> —Singapore:	
Meyer & Brown	112,000
General Rubber Co.	201,600
Fred. Stern & Co.	24,640
MARCH 24.—By the <i>Agapenor</i> —East:	
Hagemeyer Trading Co.	2,850
MARCH 24.—By the <i>Empress of Japan</i> —Hongkong:	
Henderson & Korn	11,200
General Rubber Co.	248,600
MARCH 24.—By the <i>Talthybius</i> —East:	
Fred. Stern & Co.	11,200
Hagemeyer Trading Co.	29,581
MARCH 24.—By the <i>Mohopac</i> —London:	
Meyer & Brown	44,800
General Rubber Co.	101,800
Hagemeyer Trading Co.	33,429
MARCH 24.—By the <i>Rembrandt</i> —Singapore:	
Meyer & Brown	78,400
General Rubber Co.	302,400

EXPORTS OF CEYLON GROWN RUBBER.

(From January 1 to April 2, 1916 and 1917. Compiled by the Ceylon Chamber of Commerce.)

To—	1916.	1917.
United Kingdom	5,803,943	10,122,294
France	429,850	881,082
Russia	78,400	123,130
Italy		33,600
Western Australia	56	
Canada	201,616	107,961
New South Wales	27,628	39,400
United States	8,841,721	5,171,988
Canada and Newfoundland	2,240	239,694
India	550	
Japan	45,396	22,368

Totals 15,431,400 16,741,567
(Same period 1915, 11,099,434 pounds; same period 1914, 8,790,185.)
The export figures of rubber, given in the above table for 1914, include the imports reexported. (These amount to 752,936 pounds from the Straits Settlements and 248,110 pounds from India.) To arrive at the total quantity of Ceylon rubber exported for that year deduct these imports from the total exports. The figures for 1916 and 1917 are for Ceylon rubber only.

FEDERATED MALAY STATES RUBBER EXPORTS.

The export of rubber from the Federated Malay States in the month of April, as reported by official cablegram from Kuala Lumpur, amounted to 5,955 tons, as against 7,084 tons in March and 3,914 tons in the corresponding month last year. For four months, the total export was 26,284 tons, compared with 18,021 tons in 1916 and 13,079 tons in 1915. Comparative statistics are appended:

	1915.	1916.	1917.
January	3,473	4,471	5,995
February	3,411	5,207	7,250
March	3,418	4,429	7,084
April	2,777	3,914	5,955
Total	13,079	18,021	26,284

CRUDE RUBBER ARRIVALS AT THE PORT OF NEW YORK.

The following statistics are not complete, due to Government orders prohibiting access to the records.

[The figures include the weight in Pounds.]

PARAS.

Fine. Medium. Coarse. Caucho. Cameta. Totals.

MARCH 7.—By the <i>Stephen</i> —Pará:				
General Rubber Co.	400,000	34,800	78,400	77,900=591,100
MARCH 10.—By the <i>Minas Gerais</i> —Pará:				
General Rubber Co.	100,000	6,800	4,900	=111,700
MARCH 30.—By the <i>Cuthbert</i> —Manáos:				
General Rubber Co.	155,100	11,900	42,200	=209,200
APRIL 3.—By the <i>Sao Paulo</i> —Pará:				
General Rubber Co.	215,100	2,600	2,200	=219,900
APRIL 13.—By the <i>Guajara</i> —Manáos:				
General Rubber Co.	5,900	13,800	58,400	=78,100
APRIL 25.—By the <i>Tela</i> —Pará:				
Henderson & Korn	109,200	13,900	98,800	32,200=254,100
General Rubber Co.	156,800	10,100	138,400	397,900=221,500=924,700
Meyer & Brown	36,000	40	47,020	96,300=184,760
H. A. Astlett & Co.	138,880	42,560	164,640	89,600=435,680
MAY 6.—By the <i>Maumee</i> —Buenos Aires:				
Muller, Schall & Co.	42,000		6,800	=48,800
MAY 10.—By the <i>Purus</i> —Pará:				
Henderson & Korn	32,000	12,500	22,600	47,200=114,300
Meyer & Brown	900	1,500	13,300	=15,700=25,100
Muller, Schall & Co.	110,288	11,834	46,882	130,905=1,764=301,673
General Rubber Co.	125,000	14,000	45,000	113,000=292,000
Meyer & Brown	9,000	1,500		8,700=28,100=47,300
H. A. Astlett & Co.	103,400	29,120	147,840	175,840=470,400
W. R. Grace & Co.	8,580	7,359	21,223	20,108=57,270
MAY 15.—By the <i>Panama</i> —Colon:				
Muller, Schall & Co.	11,080		980	=12,060

*Weak Fine.

APRIL 23.—By the <i>Boyle</i> —London:	POUNDS.
Meyer & Brown.....	191,500
General Rubber Co.....	113,700
L. Littlejohn & Co.....	53,760
APRIL 30.—By the <i>Mexico Maru</i> —Yokohama:	
Fred. Stern & Co.....	62,720
W. R. Grace & Co.....	6,720
APRIL 30.—By the <i>Minnehaha</i> —London:	
Rubber Trading Co.....	60,480
Fred. Stern & Co.....	49,280
Hagemeyer Trading Co.....	15,680
APRIL 30.—By the <i>Empress of Asia</i> —Hongkong:	
General Rubber Co.....	416,600
APRIL 30.—By the <i>Ecuador</i> —East:	
Henderson & Korn.....	221,200
MAY 1.—By the <i>Manchuria</i> —London:	
L. Littlejohn & Co.....	56,000
MAY 1.—By the <i>St. George</i> —London:	
Rubber Trading Co.....	22,400
L. Littlejohn & Co.....	215,040
General Rubber Co.....	334,600
Meyer & Brown.....	128,800
Hagemeyer Trading Co.....	11,600
MAY 2.—By the <i>Shinyo Maru</i> —Singapore:	
Henderson & Korn.....	181,060
Meyer & Brown.....	2,400
Rubber Trading Co.....	31,360
MAY 4.—By the <i>Orduna</i> —London:	
General Rubber Co.....	16,300
Hagemeyer Trading Co.....	11,200
MAY 4.—By the <i>Superic</i> —Colombo:	
Aldens' Successors, Ltd.....	31,300
Rubber Trading Co.....	13,440
L. Littlejohn & Co.....	105,280
Meyer & Brown.....	56,000
Fred. Stern & Co.....	22,400
W. R. Grace & Co.....	63,019
MAY 5.—By the <i>Cetric</i> —Liverpool:	
Fred. Stern & Co.....	13,440
MAY 5.—By the <i>Gocntoe</i> —Singapore:	
Henderson & Korn.....	191,500
Meyer & Brown.....	67,200
General Rubber Co.....	129,900
MAY 5.—By the <i>Sado Maru</i> —Yokohama:	
W. R. Grace & Co.....	13,440
MAY 7.—By the <i>City of Naples</i> —Colombo:	
Henderson & Korn.....	33,600
Aldens' Successors, Ltd.....	11,200
Rubber Trading Co.....	26,880
L. Littlejohn & Co.....	147,740
Meyer & Brown.....	33,600
Fred. Stern & Co.....	44,800
W. R. Grace & Co.....	28,853
MAY 7.—By the <i>Michigan</i> —London:	
Meyer & Brown.....	81,200
General Rubber Co.....	216,700
L. Littlejohn & Co.....	360,640
MAY 8.—By the <i>Isania</i> —London:	
L. Littlejohn & Co.....	11,061
MAY 9.—By the <i>Pannonia</i> —London:	
Aldens' Successors, Ltd.....	888,200
L. Littlejohn & Co.....	122,854
General Rubber Co.....	237,000
Meyer & Brown.....	44,800
MAY 11.—By the <i>Hawaii Maru</i> —Yokohama:	
W. R. Grace & Co.....	29,356
MAY 11.—By the <i>Andania</i> —London:	
General Rubber Co.....	13,200
MAY 11.—By the <i>Buitenzorg</i> —Batavia:	
Henderson & Korn.....	6,500
Rubber Trading Co.....	4,480
L. Littlejohn & Co.....	384,286
General Rubber Co.....	248,400
Meyer & Brown.....	66,600
Fred. Stern & Co.....	6,720
Hagemeyer Trading Co.....	34,015
W. R. Grace & Co.....	17,676
MAY 12.—By the <i>Ulonia</i> —London:	
Henderson & Korn.....	34,200
Aldens' Successors, Ltd.....	630,200
L. Littlejohn & Co.....	70,560
General Rubber Co.....	227,000
Meyer & Brown.....	56,000
MAY 14.—By the <i>Persia Maru</i> —East:	
Rubber Trading Co.....	44,800
MAY 14.—By the <i>Carmania</i> —London:	
General Rubber Co.....	16,300
MAY 15.—By the <i>Protesilaus</i> —East:	
Henderson & Korn.....	14,500
W. R. Grace & Co.....	47,040
Aldens' Successors, Ltd.....	35,900
MAY 16.—By the <i>Port Kembla</i> —London:	
Rubber Trading Co.....	11,200
L. Littlejohn & Co.....	156,800
General Rubber Co.....	227,400
Meyer & Brown.....	73,900
Aldens' Successors, Ltd.....	762,000
MAY 17.—By the <i>Saigon Maru</i> —Singapore:	
Henderson & Korn.....	161,300
Meyer & Brown.....	66,000
General Rubber Co.....	638,400

MAY 17.—By the <i>Philadelphia</i> —London:	POUNDS.
Meyer & Brown.....	78,400
L. Littlejohn & Co.....	22,400
General Rubber Co.....	214,000
Hagemeyer Trading Co.....	22,400
W. R. Grace & Co.....	42,913
MAY 18.—By the <i>Mongolia</i> —London:	
Rubber Trading Co.....	24,640
L. Littlejohn & Co.....	239,680
Fred. Stern & Co.....	22,400
MAY 18.—By the <i>Veendijk</i> —Sourabaya:	
Meyer & Brown.....	76,200
General Rubber Co.....	283,000
L. Littlejohn & Co.....	268,289
Hagemeyer Trading Co.....	21,450
W. R. Grace & Co.....	44,130
MAY 19.—By the <i>Mesaba</i> —London:	
Rubber Trading Co.....	11,200
L. Littlejohn & Co.....	44,800
General Rubber Co.....	210,400
Meyer & Brown.....	204,400
Aldens' Successors, Ltd.....	140,000
MAY 23.—By the <i>Baltic</i> —Liverpool:	
Aldens' Successors, Ltd.....	559,500
MAY 24.—By the <i>Vinovia</i> —London:	
Aldens' Successors, Ltd.....	698,000
MAY 24.—By the <i>Colombia</i> —Colombo:	
General Rubber Co.....	232,900
MAY 24.—By the <i>Korea Maru</i> —East:	
Rubber Trading Co.....	11,200
MAY 25.—By the <i>Rondo</i> —	
Henderson & Korn.....	27,000
MANICOBAS.	
APRIL 3.—By the <i>Sao Paulo</i> —Bahia:	
Adolph Hirsch & Co.....	27,644
APRIL 25.—By the <i>Tela</i> —Ceara:	
Adolph Hirsch & Co.....	34,897
MAY 2.—By the <i>Neches</i> —Bahia:	
Adolph Hirsch & Co.....	23,882
MAY 10.—By the <i>Purus</i> —Bahia:	
Adolph Hirsch & Co.....	70,905
MANGABEIRA.	
MAY 2.—By the <i>Neches</i> —Bahia:	
Adolph Hirsch & Co.....	13,845
MAY 10.—By the <i>Purus</i> —Bahia:	
Adolph Hirsch & Co.....	55,267
AFRICANS.	
MAY 12.—By the <i>Ostana</i> —London:	
General Rubber Co.....	8,100
APRIL 19.—By the <i>Carmania</i> —Liverpool:	
General Rubber Co.....	8,000
APRIL 23.—By the <i>Calchas</i> —Liverpool:	
Rubber Trading Co.....	12,300
Hagemeyer Trading Co.....	8,979
MAY 4.—By the <i>Formosa</i> —Hull:	
Aldens' Successors, Ltd.....	8,000
Rubber Trading Co.....	33,600
Hagemeyer Trading Co.....	10,772
MAY 9.—By the <i>Pannonia</i> —London:	
Aldens' Successors, Ltd.....	10,500
MAY 14.—By the <i>Larne</i> —	
Hagemeyer Trading Co.....	295,083
By the <i>Phlebas</i> —East:	
Fred. Stern & Co.....	22,400
By the <i>Salamis</i> —East:	
Rubber Trading Co.....	3,360
By the <i>Cargala</i> —East:	
Fred. Stern & Co.....	60,480
By the <i>Tenyo Maru</i> —East:	
Henderson & Korn.....	85,100
By the <i>Burma Maru</i> —East:	
Henderson & Korn.....	6,000
GUAYULE.	
APRIL 28.—All rail.	
Continental Rubber Co. of New York...	113,000
MAY 21.—By the <i>El Norte</i> —	
Continental Rubber Co. of New York...	103,000
MAY 23.—All rail.	
Continental Rubber Co. of New York...	51,000
SCRAP.	
APRIL 9.—By the <i>Ansonia</i> —London:	
Hermann Weber.....	66,471
APRIL 15.—By the <i>Boric</i> —Manchester:	
Hermann Weber.....	125,846
MAY 1.—By the <i>St. George</i> —London:	
Hermann Weber.....	54,964
MAY 9.—By the <i>Pannonia</i> —London:	
Hermann Weber.....	2,194
MAY 12.—By the <i>Ulonia</i> —	
Hermann Weber.....	31,454

CRUDE RUBBER ARRIVALS AT SEATTLE.

TO AKRON, OHIO

APRIL 27, 1917.—By the <i>Shelbuka Maru</i> —Yokohama:	POUNDS.
H. B. M. Consul General, San Francisco.	114,885

APRIL 30, 1917.—By the <i>Mexico Maru</i> —Yokohama:	POUNDS.
Goldman, Sachs & Co.....	39,150
The Goodyear Tire & Rubber Co.....	49,275
MAY 4, 1917.—By the <i>Sado Maru</i> —Yokohama:	
Firestone Tire & Rubber Co.....	139,995
MAY 10, 1917.—By the <i>Hawaii Maru</i> —Yokohama:	
The Goodyear Tire & Rubber Co.....	83,565
The B. F. Goodrich Co.....	17,685
MAY 15, 1917.—By the <i>Protesilaus</i> —Yokohama:	
The Goodyear Tire & Rubber Co.....	124,200
MAY 18, 1917.—By the <i>Saigon Maru</i> —Kobe:	
Firestone Tire & Rubber Co.....	471,690
The Goodyear Tire & Rubber Co.....	8,100
The B. F. Goodrich Co.....	58,590
TO SEATTLE, WASHINGTON.	
APRIL 30, 1917.—By the <i>Mexico Maru</i> —Yokohama:	
Charles T. Wilson Co., Inc.....	22,545
W. R. Grace & Co.....	2,295
MAY 4, 1917.—By the <i>Sado Maru</i> —Yokohama:	
W. R. Grace & Co.....	11,610
L. Littlejohn & Co.....	112,050
MAY 10, 1917.—By the <i>Hawaii Maru</i> —Yokohama:	
W. R. Grace & Co.....	20,925
British Consulate General, Seattle.....	5,400
MAY 15, 1917.—By the <i>Protesilaus</i> —Yokohama:	
W. R. Grace & Co.....	34,290
Aldens' Successors, Ltd.....	14,175
Robinson & Co.....	76,410
MAY 18, 1917.—By the <i>Saigon Maru</i> —Kobe:	
Arnold & Zeiss.....	140,400
Rubber Trading Co.....	32,400
Mitsui & Co., Ltd.....	58,860
MAY 23.—By the <i>Tenyo Maru</i> —Singapore:	
The B. F. Goodrich Co.....	570,780
Henderson & Korn.....	31,995
Robinson & Co.....	61,020
Arnold & Zeiss.....	33,075
East Asiatic Co.....	46,305
L. Littlejohn & Co.....	154,170
Rubber Trading Co.....	11,880
The Goodyear Tire & Rubber Co.....	4,455
TO WATERTOWN, MASS.	
APRIL 30, 1917.—By the <i>Mexico Maru</i> —Yokohama:	
Hood Rubber Co.....	63,720
MAY 18, 1917.—By the <i>Saigon Maru</i> —Kobe:	
The Hood Rubber Co.....	73,440
TO NEW YORK, N. Y.	
APRIL 30, 1917.—By the <i>Mexico Maru</i> —Yokohama:	
Fred Stern & Co.....	62,640
J. T. Johnstone & Co.....	37,935
Charles T. Wilson Co., Inc.....	68,850
Rubber Trading Co.....	22,815
L. Littlejohn & Co.....	21,330
Arthur Meyer & Co.....	22,545
Robinson & Co.....	34,425
East Asiatic Co.....	7,155
Edward Maurer & Co., Inc.....	8,100
Robt. Badenhop Co.....	84,240
MAY 10, 1917.—By the <i>Saigon Maru</i> —Yokohama:	
Henderson & Korn.....	122,580
Arthur Meyer & Co.....	270
Fred Stern & Co.....	135
Robinson & Co.....	135
General Rubber Trading Co.....	405
L. Littlejohn & Co.....	135
MAY 15, 1917.—By the <i>Protesilaus</i> —Yokohama:	
L. Littlejohn & Co.....	37,935
Aldens' Successors.....	62,910
East Asiatic Co.....	13,500
Henderson & Korn.....	9,585
J. T. Johnstone & Co.....	13,500
Robinson & Co.....	16,335
Edward Maurer & Co., Inc.....	2,430
Meyer & Brown.....	135
Rubber Trading Co.....	23,085
Fred Stern & Co.....	65,745
Arthur Meyer & Co.....	20,925
H. R. J. Co., Inc.....	100,575
Frank D. Ross & Co.....	497,745
MAY 18, 1917.—By the <i>Saigon Maru</i> —Kobe:	
Alexander & Baldwin.....	19,575
United States Rubber Co.....	604,530
Meyer & Brown.....	66,000
Robinson & Co.....	16,740
MAY 23.—By the <i>Tenyo Maru</i> —Singapore:	
L. Littlejohn & Co.....	7,200
Arthur Meyer & Co.....	2,700
Fred Stern & Co.....	1,700
Frank D. Ross & Co.....	46,440

CUSTOM HOUSE STATISTICS.

EXPORTS OF RUBBER GOODS TO NON-CON-
TIGUOUS TERRITORIES OF THE UNITED
STATES.

To—	March, 1917.	
	Pounds.	Value.
Alaska:		
Belting, hose and packing		\$12,174
Boots and shoes	7,088	1,706
Other rubber goods		3,682
Total		\$35,652
To—		
Hawaii:		
Belting, hose and packing		\$11,559
Automobile tires and tubes		93,339
Other rubber goods		17,134
Total		\$140,454
To—		
Philippine Islands:		
Belting, hose and packing		\$8,722
Boots and shoes		10,515
Tires		48,700
Other rubber goods		14,999
Total		\$82,936
To—		
Porto Rico:		
Belting, hose and packing		\$4,756
Automobile tires and tubes		28,623
Other rubber goods		240
Total		\$11,539
Total		\$45,158

UNMANUFACTURED—

From—	February, 1917.	
	Pounds.	£ Sterling.
Ceylon and dependencies	1,448,900	216,251
Other countries	568,300	73,955
Totals	16,367,600	2,268,990
Waste and reclaimed rubber	186,300	5,083
Manufactures:		
Apparel, waterproofed	507	
Boots and shoes...doc. pairs	24,200	42,634
Insulated wire		3,941
Automobile tires and tubes	79,752	79,752
Motorcycle tires and tubes	6,278	6,278
Cycle tires and tubes	1,675	1,675
Tires not specified	1,548	1,548

EXPORTS.

To—	February, 1917.	
	Pounds.	£ Sterling.
France	14,590	
British East Indies	2,637	
New Zealand	1,633	
Other countries	3,883	
Total	2,531	
Boots and shoes...doc. pairs	7,722	7,698
Insulated wire	25,406	29,072
Submarine cables	49,821	49,821
Automobile tires and tubes	8,141	8,141
Motorcycle tires and tubes	21,220	21,220
Cycle tires and tubes	8,855	8,855
Tires not specified	123,121	123,121
Manufactures not specified		

EXPORTS—FOREIGN AND COLONIAL.

To—	February, 1917.	
	Pounds.	£ Sterling.
Russia	1,139,900	150,880
France	3,120,500	453,221
United States	8,463,300	1,215,736
Other countries	1,819,200	265,885
Totals	14,542,900	2,085,722
Waste and reclaimed	63,600	2,196
Gutta percha	73,024	9,967
Boots and shoes...doc. pairs	11,215	13,130
Automobile tires and tubes	27,808	27,808
Motorcycle tires and tubes	782	782
Cycle tires and tubes	29	29
Tires not specified	252	252

UNITED KINGDOM RUBBER
STATISTICS.

[The import and export figures by countries usually published in this table are withheld by the British Government.]

IMPORTS.

From—	March, 1917.	
	Pounds.	£ Sterling.
Crude rubber	19,943,900	2,866,676
Waste and reclaimed rubber	311,500	7,380
Gutta percha	953,568	143,081
Manufactures:		
Apparel, waterproofed		1,841
Boots and shoes...doc. pairs	20,914	36,190
Insulated wire		7,368
Automobile tires and tubes		95,821
Motorcycle tires and tubes		42,862
Cycle tires and tubes		3,484
Tires not specified		2,663

EXPORTS.

To—	March, 1917.	
	Pounds.	£ Sterling.
Waste and reclaimed rubber	8,700	1,441
Manufactures:		
Apparel, waterproofed		47,882
Boots and shoes...doc. pairs	6,696	7,307
Insulated wire		27,364
Submarine cables		14,127
Automobile tires and tubes		70,311
Motorcycle tires and tubes		11,482
Cycle tires and tubes		20,856
Tires not specified		12,807
Manufactures not specified		142,295

EXPORTS—FOREIGN AND COLONIAL.

To—	March, 1917.	
	Pounds.	£ Sterling.
Crude rubber	9,540,500	1,402,938
Waste and reclaimed rubber	55,900	2,161
Gutta percha	46,256	7,101
Boots and shoes...doc. pairs	928	1,125
Automobile tires and tubes		34,463
Motorcycle tires and tubes		569
Cycle tires and tubes		7,053
Tires not specified		388

UNITED KINGDOM RUBBER
STATISTICS.

IMPORTS.

From—	February, 1917.	
	Pounds.	£ Sterling.
Dutch East Indies	1,490,800	204,724
French West Africa	74,400	5,243
Gold Coast	795,300	74,933
Other countries in Africa	137,400	18,708
Peru	3,786,500	556,370
Brazil	466,700	62,942
British India		
Straits settlements and dependencies	2,995,800	445,188
Labuan	4,426,300	592,131
Federated Malay States		

LONDON AND LIVERPOOL RUBBER STATISTICS.

IMPORTS.

From—	March, 1917.	
	London.	Liverpool.
Crude rubber:	Pounds. £ Sterling.	Pounds. £ Sterling.
German West Africa		26,400
French West Africa		134,700
Portuguese West Africa		96,300
Portuguese East Africa	12,900	1,950
Java	16,200	1,660
Other countries in Africa		3,800
British India	867,900	128,034
United States	5,400	634
Peru		300
Brazil		1,600
French West Africa		2,680,800
Portuguese West Africa		384,862
Java		57,100
Other countries in Africa		7,590
British India		32,100
Straits settlements and dependencies		4,088
Labuan		73,900
Federated Malay States		3,725
Ceylon		106,200
British East Africa Protectorate		5,327
Zanzibar		85,900
Uganda		6,024
Nyasaland		
Swaziland		
British East Africa Protectorate	23,600	2,695
Zanzibar	4,100	330
Uganda	9,000	1,200
Nyasaland	4,000	600
Swaziland	400	700
British East Africa Protectorate	335,500	48,725
Straits Settlements	3,259,000	467,912
Federated Malay States	6,436,400	968,635
Ceylon	3,480,800	576,926
British East Africa Protectorate	232,300	34,342
New South Wales	5,600	843
Fiji Islands	4,100	500
British East Africa Protectorate	2,100	341
British West Africa	400	55
Liberia		13,000
Totals	14,700,700	2,185,452

*Deduct to amend account February.

March, 1917.

From—	London.		Liverpool.	
	Pounds.	£ Sterling.	Pounds.	£ Sterling.
Waste and reclaimed rubber:				
From—				
Spain			14,000	250
United States			2,823	
Channel Islands	1,000	15		
New Zealand	1,300	15		
Totals	2,300	75	16,823	2,573
Waste and reclaimed rubber manufactures of the United Kingdom:				
To—				
France	13,300	1,088	38,400	1,240
Italy	215,700	2,826		
United States	509,800	6,686		
Canada		314		
Totals	776,900	10,914		
Crude rubber:				
To—				
Russia	2,200	340	540,800	74,004
France	1,131,700	175,286	1,245,700	193,278
Italy	487,800	72,667	290,700	44,630
United States	4,523,700	701,558	638,300	55,943
Canada	185,400	27,914	7,100	795
Argentina Republic		250		
Japan (including Formosa and Japanese territories)			22,100	3,860
Cape of Good Hope				38
New South Wales				
Totals	6,332,300	973,015	2,750,600	374,118
Waste and reclaimed rubber:				
To—				
Russia			23,000	
France	5,000		16,100	644
Canada			11,200	560
Totals		250	50,300	1,911

RUBBER STATISTICS FOR ITALY.

IMPORTS OF CRUDE AND MANUFACTURED RUBBER.

	Twelve Months Ending December.			
	1916.		1915.	
	Pounds.	Lire.	Pounds.	Lire.
UNMANUFACTURED—				
India rubber and gutta percha raw and reclaimed:				
Great Britain.....	4,121,040	.....	440	.....
Strait Settlements.....	1,186,460	.....	2,767,600	.....
African French Colony.....	61,380	.....	32,120	.....
Belgian Congo.....	219,120	.....	294,580	.....
Brazil.....	4,304,740	.....	7,904,600	.....
Other countries.....	1,810,820	.....	808,720	.....
Totals.....	11,703,560	42,558,400	11,808,060	42,938,400
Rubber scrap.....	6,309,200	2,605,590	3,664,140	1,498,950
MANUFACTURED—				
India rubber and gutta percha—threads:				
United States.....	67,540	.....	48,400	.....
Great Britain.....	29,040	.....	54,780	.....
Other countries.....	6,600	.....	3,520	.....
Totals.....	103,180	938,000	106,700	970,000
India rubber and gutta percha—sheets:				
Cut sheets.....	3,740	28,900	4,620	35,700
Elastic fabrics.....	1,980	4,050	4,620	9,450
Insulated wire.....	440	600	440	600
Hard rubber.....	84,260	2,640	40,480	147,200
India rubber and gutta percha—tubes:				
Cut sheets.....	1,100	9,000	1,980	16,200
Elastic fabrics.....	16,500	45,000	43,120	117,600
Other forms.....	6,820	21,700	4,400	14,000
Beltting.....	151,800	493,000	60,500	192,500
Rubber coated fabrics.....pieces	118,580	754,600	109,120	694,400
Other fabrics:				
Great Britain.....	45,320	.....	47,960	.....
Other countries.....	2,640	.....	3,300	.....
Totals.....	47,960	218,000	51,260	233,000
Boots and shoes—pairs:				
United States.....	47,557	.....	3,220	.....
France.....	12,305	.....	58,553	.....
Other countries.....	196	.....	6,802	.....
Totals.....	60,058	300,290	63,775	318,875
Others.....	220	1,400		
Elastic webbing:				
France.....	36,740	.....	22,440	.....
Great Britain.....	15,400	.....	13,860	.....
Other countries.....	15,620	.....	44,000	.....
Totals.....	67,760	462,000	80,300	547,500
Clothing and articles for travel	4,180	43,700	5,500	57,500
Articles not specified:				
From cut sheets.....	14,960	136,000	23,540	214,000
Fabrics:				
France.....	220,000	.....	28,820	.....
Great Britain.....	124,740	.....	178,200	.....
Other countries.....	17,160	.....	60,280	.....
Totals.....	361,900	1,480,500	267,300	1,093,500
Tires and tubes:				
France.....	1,655,060	.....	408,760	.....
Great Britain.....	543,820	.....	262,020	.....
Other countries.....	35,420	.....	107,800	.....
Totals.....	2,236,300	20,330,000	778,580	7,078,000
Other rubber manufactures:				
France.....	962,500	.....	1,611,280	.....
Great Britain.....	850,740	.....	1,085,480	.....
United States.....	1,411,300	.....	1,292,720	.....
Other countries.....	1,540	.....	80,520	.....
Totals.....	3,226,080	11,731,200	4,070,000	14,800,000
Total imports.....		82,164,570		70,977,375

EXPORTS OF CRUDE AND MANUFACTURED RUBBER.

Twelve Months Ending December.

UNMANUFACTURED—	1916.		1915.	
	Pounds.	Lire.	Pounds.	Lire.
India rubber and gutta percha —raw and reclaimed:				
United States	515,020	.....	211,860	.....
Great Britain	40,040	.....	36,300	.....
Spain	476,300	.....	433,840	.....
Other countries	13,640	.....	47,080	.....
Totals	1,045,000	1,900,000	729,080	1,325,000
Rubber scrap			36,080	14,760

	Twelve Months Ending December.			
	1916.		1915.	
	Pounds.	Lire.	Pounds.	Lire.
MANUFACTURED—				
India rubber and gutta percha—threads:				
France.....	15,180	.....	5,500	.....
Great Britain.....	10,120	.....	1,980	.....
Spain.....	12,540	.....	5,940	.....
Switzerland.....	7,040	.....	46,480	.....
Argentina.....	3,740	.....	7,040	.....
Other countries.....	4,180	.....	18,700	.....
Totals.....	52,800	480,000	79,640	724,000
India rubber and gutta percha—sheets:				
Cut sheets.....	5,280	48,000	14,520	112,200
Elastic fabric.....	4,840	9,900	1,980	4,050
Insulated wire.....	880	1,200	1,100	1,500
Hard rubber.....	45,540	165,600	20,680	75,200
India rubber and gutta percha—tubes:				
Cut sheets.....	11,440	93,600	14,740	120,600
Elastic fabric.....	176,000	480,000	98,120	267,600
Other forms.....	126,940	403,900	75,240	239,400
Beltting.....	1,540	4,900	6,160	19,600
Rubber coated fabrics.....pieces	138,600	535,500	112,420	434,350
Boots and shoes.....pairs	2	30	50	250
Elastic webbing:				
France.....	11,220	.....	6,600	.....
Greece.....	124,520	.....	60,060	.....
Spain.....	17,160	.....	7,920	.....
Switzerland.....	95,700	.....	45,540	.....
Egypt.....	27,720	.....	11,440	.....
Argentina.....	113,960	.....	73,260	.....
Brazil.....	125,400	.....	89,760	.....
Chile.....	25,960	.....	11,440	.....
Cuba.....	35,640	.....	36,960	.....
Other countries.....	65,780	.....	57,200	.....
Totals.....	643,060	4,384,500	400,180	2,728,500
Clothing and articles for travel	3,740	39,100	880	9,200
Articles not specified:				
From cut sheets:				
Great Britain.....	11,660	.....	4,840	.....
Spain.....	440	.....	880	.....
Argentina.....	24,860	.....	13,200	.....
Brazil.....	220	.....	1,100	.....
Uruguay.....	5,060	.....	5,720	.....
Other countries.....	1,980	.....	5,500	.....
Totals.....	44,220	402,000	31,240	284,000
Fabrics.....	78,760	322,200	41,140	168,300
Tires and tubes:				
France.....	617,540	.....	378,840	.....
Great Britain.....	3,963,520	.....	3,204,960	.....
Switzerland.....	67,540	.....	215,600	.....
India and Ceylon.....	429,000	.....	507,320	.....
Australia.....	81,620	.....	55,660	.....
Argentina.....	1,688,340	.....	1,126,840	.....
Brazil.....	529,320	.....	423,500	.....
Uruguay.....	27,720	.....	16,280	.....
Other countries.....	778,800	.....	2,808,960	.....
Totals.....	7,555,680	68,688,000	8,721,680	79,288,000
Other rubber manufactures:				
Albania.....	7,260	.....	20,680	.....
France.....	65,780	.....	61,600	.....
Great Britain.....	83,380	.....	78,760	.....
Spain.....	13,860	.....	168,300	.....
Switzerland.....	94,380	.....	4,840	.....
Egypt.....	14,080	.....	90,640	.....
Argentina.....	106,140	.....	25,520	.....
Brazil.....	69,300	.....	16,280	.....
Uruguay.....	27,720	.....	119,680	.....
Other countries.....	43,560	.....	
Totals.....	528,440	1,921,600	586,300	2,132,000
Total exports.....		79,872,810		87,949,110

The nominal value of a lira is \$0.193

THE MARKET FOR RUBBER SCRAP.

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NEW YORK.

THE conditions surrounding the rubber scrap market have not materially changed during the past month. A feeling of optimism, however, has prevailed, resulting in a firm undertone that indicates higher prices. This sentiment is reflected from general conditions that bespeak higher values for all commodities, crude rubber being in a particularly strong position. While the mills have undoubtedly been in the market, the buying has been confined to limited quantities for immediate requirements. The uncertainties now besetting the materials used in the rubber industry have restricted buying and encouraged the policy of awaiting future market developments.

BOOTS AND SHOES. This material has received fair attention and while the actual business transacted has not been large, the market tone has been firm and prices have advanced about $\frac{1}{4}$ cent per pound since our last report. This is doubtless due to orders from the Government and the Allies for rubber footwear that is now considered necessary in every soldier's equipment.

TIRES. The call for tires has been limited to small lots, the business done being of a routine character, with the greater interest centered in standard mixed grades. Prices have been firm, ranging from 7 to $7\frac{1}{4}$ cents delivered. White G. & G. tires have been featureless, sales being recorded at $7\frac{1}{2}$ cents delivered. Bicycle tires have experienced a fair demand at firm prices unchanged from last month's quotations.

The scarcity of standard cotton fabrics has driven tire manufacturers to use Peeler fabrics with the result that the quantity of unguaranteed tires now being manufactured will be greatly increased in the future.

INNER TUBES. There has been limited call for this material and prices are unchanged, $25\frac{1}{2}$ cents delivered being the quotations on No. 1 tubes. Just what effect the greatly increased use of unguaranteed tires will have on tubes remains to be seen. That the supplies of tubes will be augmented thereby is unquestioned.

MECHANICALS. The general industrial activity has increased the call for mechanical rubber goods and the mills are very busy. The movement in mechanical scrap has been good during the month, garden hose, air brake hose and cotton hose being in particular demand and at about $\frac{1}{4}$ cent advance over last month's prices.

London and Liverpool imports of waste and reclaimed rubber for March were 114,600 pounds, compared to 38,000 pounds for February. Reexports for March were 55,900 pounds, compared to 63,600 pounds for February. London and Liverpool exports of waste and reclaimed rubber manufactures of the United Kingdom for March were 815,300 pounds.

NEW YORK QUOTATIONS FOR CARLOAD LOTS DELIVERED.

MAY 28, 1917.

Prices subject to change without notice.

	Per Pound.
Boots and shoes.....	\$6
Trimmed arctics	1.75
Untrimmed arctics .....	.06 $\frac{1}{2}$ @
White tires, Goodrich and Goodyear.....	.07
Auto tires, standard white.....	.07 $\frac{1}{4}$
standard mixed .....	.07
stripped, unguaranteed .....	.05 $\frac{1}{2}$
Auto peelings, No. 1.....	.10
No. 2.....	.08 $\frac{1}{4}$
Inner tubes, No. 1.....	.13
No. 2.....	.12 $\frac{1}{2}$ @
red .....	.11
Irony tires .....	.02 $\frac{1}{4}$ @
Bicycle tires .....	.04 $\frac{1}{2}$ @
Solid tires .....	.09
White scrap, No. 1.....	.13 $\frac{1}{2}$ @
No. 2.....	.10
Red scrap, No. 1.....	.10
No. 2.....	.08
Mixed black scrap, No. 1.....	.04 $\frac{1}{2}$ @
No. 2 .....	.04
Rubber car springs.....	.04 $\frac{1}{2}$ @
Horse shoe pads.....	.04 $\frac{1}{2}$ @
Matting and packings.....	.01 $\frac{1}{2}$ @
Garden hose .....	.02 $\frac{1}{4}$
Air brake hose.....	.05 $\frac{1}{4}$ @
Cotton fire hose.....	.02 $\frac{1}{2}$ @
Large hose .....	.01
Hard rubber scrap, No. 1, bright fracture.....	.26
Battery jars (black compound).....	.02 $\frac{1}{2}$ @
Insulated wire stripping.....	.03 $\frac{1}{2}$ @
Rubber heels .....	.03 $\frac{1}{4}$ @

THE MARKET FOR COTTON AND OTHER FABRICS.

Copyright 1917.

NEW YORK.

AMERICAN COTTON. Early in the month the market was decidedly unsettled and nervous, owing to the reports of reduced acreage and the uncertainty of domestic demand for cotton manufactures. On May 1, spot middlings were selling at 20.70 cents but lacked support and the market declined with minor fluctuations until May 11, when 20 cents, the lowest price of the month, was recorded. Influenced by more reassuring reports, the market sentiment changed and prices took an upward trend that persisted until May 26 when spot middlings were quoted at 21.95 cents in one of the most active days the market has experienced in months, due to the belief that the coming Government report will forecast a short crop.

EGYPTIAN COTTON. The general market condition has not improved during the month and stocks are very low and prices are high, ranging from 60 to 66 cents. The shipping situation has been relieved in a measure by the shipment of 15,000 bales direct to America and which is still afloat. From recent reports it appears that the prospects for the new crop are good and that the acreage is somewhat larger than last.

SEA ISLAND COTTON. The crop of Islands has all been sold and the new crop will not be marketed before October. The market for Georgias and Floridas has been quiet with limited offerings. The unsold portion of the crop is estimated at 2,000 bales that are firmly held at prices varying from 71 to 72 cents, according to quality.

It is reported that the planters of the British West Indies, influenced by the present attractive prices, have resumed the planting of Sea Island cotton, 2,000 acres being recently planted in Nevis. The planters of Montserrat, Anguilla, Antigua, St. Croix, Barbados, St. Kitts, and St. Vincent will doubtless increase their acreage of Sea Island cotton to meet the present extraordinary demand.

TIRE FABRICS. The demand for all grades has been quiet for the past month with the interest centered on prompt deliveries. Buyers have not been particularly interested in futures, preferring to await developments. The scarcity and high prices of Sea Island and Egyptian tire fabrics have resulted in unprecedented offering of Peeler fabric. While the blending of long staple Peeler with the standard yarns has been practiced and $17\frac{1}{4}$ -ounce combed Peeler fabric tried out, the results of these experiments are still indefinite. There is no doubt that staple cotton under $1\frac{1}{2}$ -inch will be more extensively used in fabrics for unguaranteed tires to meet the increasing demand. Prices on standard Sea Island and Egyptian building fabric have not changed; $17\frac{1}{4}$ -ounce combed Peeler fabric has advanced 10 cents a square yard and carded Peelers are 5 cents higher than a month ago.

MECHANICAL DUCK. The general industrial activity and the speeding up of factories, mills and mines is requiring large quantities of mechanical rubber goods and the demand for mechanical, hose and belting duck has been very active. This is primarily due to Government orders that will require, it is estimated, 50 per cent of the duck produced in this country. Hose and belting duck have advanced about 1 cent a pound during the month.

SHEETINGS, OSNABURGS, ENAMELING DUCK. The demand has been unprecedented, spot stocks have been completely cleaned up and seconds and odd lots are promptly taken when offered. Government orders are so heavy for these fabrics that the supply may not be equal to the demand. Prices have all advanced about 1 cent a yard. Drills are very active and scarce, but prices have not yet advanced.

The mills are now complaining of scarcity of labor, high price of coal, shipping difficulties and a general increase in operating expenses that would indicate still higher producing costs and further price advances to the consumer.

NEW YORK QUOTATIONS.

MAY 28, 1917.

Prices in dollars unless otherwise stated.

Wamsutta, S. A. I. L. No. 1, 40-inch.....yard \$0.47 @

No. 4, 38-inch.....yard 40.2 @

Wool Stockinettes—52-inch:

A 14-ounce.....yard 1.75 @
P 14-ounce.....yard 2.25 @
C 14-ounce.....yard 2.50 @

Cotton Stockinettes—52-inch:

1 14-ounce.....yard .85 @ .90
1 11-ounce.....yard .60 @ .65
1 8-ounce.....yard .85 @ .90
1 5-ounce.....yard .75 @ .80
1 11-ounce.....yard .70 @ .85
1 8-ounce.....yard .60 @ .65

Colors—white, black, blue, brown.

Nominee Stockinette.....yard 1.60 @ 1.65

Tire Fabrics:

1 14-ounce Sea Island, combed.....yard 1.50 @ 1.55
1 11-ounce Egyptian, combed.....yard 1.30 @ 1.35
1 8-ounce Egyptian, combed.....yard 1.25 @ 1.30
1 5-ounce Peckers, combed.....yard .95 @ 1.02
1 7/8-ounce Peckers, carded.....yard .75 @ .80

Sheeting:

4 1/2-inch 36-yard.....yard .17 @
4 1/2-inch 24-yard.....yard .17 @
4 1/2-inch 18-yard.....yard .17 @
4 1/2-inch 14-yard.....yard .14 @

Osnaburgs:

4 1/2-inch 24-yard.....yard .18 @
40-inch 248-yard.....yard .17 @
40-inch 244-yard.....yard .17 1/2 @

Mechanical Ducks:

11 1/2-inch.....yard .42 @ .43
10 1/2-inch.....yard .4 @ .43

Carriage Cloth Duck:

38-inch 2.00-yard enameling duck.....yard .23 @
38-inch 1.74-yard.....yard .26 @
7 1/2-inch 16.60-ounce.....yard .48 @
72-inch 17.21-ounce.....yard .50 @

Drills:

38-inch 2.00-yard.....yard .20 1/2 @
40-inch 2.47-yard.....yard .16 1/2 @
5 1/2-inch 1.90-yard.....yard .2 @
52-inch 1.95-yard.....yard .21 1/2 @
60-inch 1.52-yard.....yard .21 1/2 @

Imported Woolen Fabrics Specially Prepared for Rub-

berizing—Plain and Fancies:
63-inch, 3 1/4 to 7 1/4 ounces.....yard .38 @ 1.55
36-inch, 2 1/4 to 5 ounces.....yard .35 @ .85

Imported Plaid Lining (Union and Cotton):

63-inch, 2 to 4 ounces.....yard .38 @ .75
36-inch, 2 to 4 ounces.....yard .25 @ .50

Domestic Worsted Fabrics:

36-inch, 4 1/2 to 8 ounces.....yard .35 @ .65
Domestic Woven Plain Linings (Cotton):

36-inch, 3 1/2 to 5 ounces.....yard .1 @ .18

Raincoat Cloth (Cotton):

Bombazine.....yard .08 @ .18
Tallies.....yard .25 @ .35
1 1/2-inch.....yard .08 @ .15
1 1/2-inch, printed.....yard .08 @ .10
Plaid.....yard .08 @ .10
Rep.....yard .24 @ .27

Burlaps:

2 1/2-inch.....yard Nominal
3 1/2-inch.....yard 9.00 @
4 1/2-inch.....yard 11.50 @ 11.75
4 1/2-inch.....yard Nominal
4 1/2-inch.....yard Nominal
4 1/2-inch.....yard Nominal
4 1/2-inch.....yard Nominal

EGYPTIAN COTTON CROP MOVEMENT

From Aug. 1, 1916, to April 4, 1917.

To—	1916-17.	1915-16.	1914-15.
Liverpool.....bales	172,626	187,276	168,633
Manchester.....	115,258	118,803	130,243
Total shipments to Great Britain.....	287,884	306,079	298,876
To—			
France.....	16,413		
Spain.....	10,121		
Italy.....	25,023		
Switzerland.....	14,899		
Russia.....	22,261	38,989	36,360
Greece.....	65	265	2,109
Total shipments to Continent.....	88,782	128,285	221,339
To—			
United States.....	105,215	182,583	122,911
India.....	100		
Japan.....	9,105	22,610	11,418
Total shipments to all parts.....	491,086	639,557	654,544
Total crop (interior gross weight), cantars.....		4,726,518	6,473,726

(Compiled by Parsons, Benesh & Co., Liverpool.)

SEA ISLAND COTTON CROP MOVEMENT.

FROM AUGUST 1, 1916, TO MARCH 30, 1917.

	Receipts.	
	1916-17.	1915-16.
Stock on hand, August 1, 1916—		
Savannah, 2,401; Charleston, 107.....bales	2,508	2,382
Received at Savannah (gross).....	45,286	35,401
Received at Charleston.....	3,455	5,647
Received at Jacksonville.....	38,572	26,410
Totals.....	89,821	69,840
Less exports.....	86,178	63,225

Stock March 30, 1917—

Savannah, 3,632; Charleston, 11.....3,643 6,615
Crop in sight at all ports to date.....86,953 67,022

EXPORTS.

	To				
From	Great Britain.	Continent.	Northern Mills.	Southern Mills.	Totals.
Savannah ..	1,252		36,803	5,766	44,055
Charleston ..	313		3,238		3,551
Jacksonville ..			38,572		38,572
Totals ..	1,565	120	78,613	5,766	*86,178
1915-16	1,295		55,887	4,983	63,225
	Inc. 270	Inc. 8	Inc. 22,726	Inc. 783	Inc. 22,953

* In addition to the exports shown above, it is estimated that at least 20,000 bales have been shipped direct from interior points to Southern mills and to Northern mills via Norfolk, but the exact figures of this movement will not be available until the end of the season.

† Including 114 bales burned at Savannah.
Compiled by John Malloch & Co., Savannah, Ga.

THE MARKET FOR CHEMICALS AND COM-
POUNDING INGREDIENTS.

Copyright 1917.

NEW YORK.

ALL the base metals have maintained a very strong position during the month, lead being the feature, having advanced in price due to the certainty of large Government requirements and the knowledge that stocks are small. The firm tone in spelter, despite inactivity, is based on the high price of ore and the anticipation of heavy Government buying in the near future. Copper has been firm and prices nominal. Consumers are interested but appear to be waiting market developments before buying. Antimony metal has been generally dull and prices unchanged. Aluminum has not been in demand, with prices ruling at 59@61 cents for No. 1 metal. The spot demand for rubber chemicals has been brisk and available stocks of many materials have been well cleaned up. Beyond making frequent inquiries, consumers do not appear to be interested in future commitments, preferring to await market developments. The tone of the market has been strong, with a general upward tendency, many materials having advanced in price since last month.

ALUMINUM FLAKE. This material is strong and in active demand. Prices have advanced about \$1 a ton during the past month.

ANILINE OIL. This is very strong, due to scarcity of base materials. Prices have advanced.

ASBESTINE. Stocks are said to be low and prices have advanced.

BARYTES. The trading in the imported grades has been quiet and prices unchanged, while the demand for domestic barytes has been good at firm prices.

CARBON BISULPHIDE. The demand has been good and prices have been firm, with advancing tendencies due to low stocks.

CHINA CLAY. Shipping difficulties have held up supplies and stocks are insufficient to meet the demand. Both foreign and domestic grades have advanced in price.

DRY COLORS. The market has been generally firm in price with certain colors totally lacking in demand. There was a noticeable scarcity of some imported grades and certain domestic stocks were unobtainable. Carbon gas black has been firm and producers well sold up on contracts. Prussian blues have held a strong position, while browns are in moderate demand. The greens are firm, and the market for reds is fairly easy. Chrome yellow is firmer, due to the strong position of lead.

LITHOPONE. There has been a good demand for this material and prices have been well maintained, due to the strong position of the base metals.

LEAD PIGMENTS. White lead, basic carbonate and basic sulphate, red lead, litharge and orange mineral have all advanced during the month, due to the strong position of pig lead.

OILS. The oil market has developed a very firm tone recently on account of shipping difficulties and scarcity of labor. Linseed, corn and rapeseed oil have all advanced. This will affect the price of rubber substitutes.

SULPHUR FLOUR. The demand has been heavy and while prices have not changed, the tendency is upward.

WAXES. These are generally higher in price, caused by the uncertainty in the shipping situation, both foreign and domestic.

ZINC OXIDE. The demand for spot zinc oxide has been very active and the limited offerings available have been quickly absorbed. Speculative prices have advanced $2\frac{1}{2}$ @3 cents during the month. The producers are busy supplying contract deliveries and are apparently not interested in the spot market. The fear that there is not sufficient stock to meet the demand is causing some concern in the consuming trade.

NEW YORK QUOTATIONS

MAY 28, 1917.

Subject to change without notice.

Accelerene (drums).....	lb.	8.62	@	
Acetone (drums).....	gal.	1.24	@	30 1/2
Acid, acetic, 24 per cent (drums).....	gal.	1.00	@	
cresylic (crude).....	gal.	1.00	@	
lactic, 99 per cent (drums).....	gal.	1.30	@	31
malic, 20 degrees.....	gal.	1.31	@	
nitric, 36 degrees.....	gal.	1.06	@	
sulphuric, 66 degrees.....	gal.	1.01	@	
Aldehyde ammonia (crystals).....	lb.	.85	@	1.00
Aluminum flake (carloads).....	ton	24.00	@	25.00
Ammonium carbonate.....	lb.	.11 1/2	@	
Antimony, crimson, sulphuret of (casks).....	lb.	.50	@	
crimson, "Magmetco".....	lb.	Nominal		
crimson, "Mephisto" (casks).....	lb.	.31	@	
golden, sulphuret of (casks).....	lb.	.27	@	.30
golden, "Magmetco".....	lb.	Nominal		
golden, "Mephisto".....	lb.	.31	@	
golden, sulphuret, States brand, 16-17 per cent.....	lb.	.28	@	
red sulphuret, States brand.....	lb.	.25	@	
vermillion sulphuret.....	lb.	.24	@	
Asbestine (bags).....	ton	17.81	@	18.00
Asbestos (bags).....	ton	35.00	@	50.00
Barium sulphate, precipitated.....	lb.	.04	@	.05
Barytes, pure white.....	ton	30.00	@	35.00
off color.....	ton	19.00	@	25.00
Basofoz.....	ton	8.75	@	
Benzoil, pure.....	gal.	.55	@	.60
90 per cent.....	gal.	.55	@	.60
Beta-Naphthol.....	lb.	.95	@	
Brown oxide of iron.....	lb.	.01 1/2	@	.02
sienna, raw and burnt.....	lb.	.05	@	.10
umber, raw and burnt.....	lb.	.04 1/2	@	.06
ochre, domestic.....	lb.	.04 1/2	@	
imported.....	lb.	.04	@	
Bone ash.....	lb.	.06	@	.10
black.....	lb.	.06	@	.10
oil.....	lb.	.06	@	.10
Cadmium tri-sulphate (f. o. b. London).....	lb.	2.49	@	2.69
sulphide, yellow.....	lb.	2.15	@	2.25
Cantella gum.....	lb.	.37	@	
Carbon, bisulphide (drums).....	lb.	.06	@	.06 1/2
black (cases).....	lb.	.28	@	.35
tetrachloride (drums).....	lb.	.15	@	.18
Caustic soda, 76 per cent.....	lb.	.06	@	.06 1/2
Chalk, precipitated, extra light.....	lb.	.04 1/2	@	.05 1/2
precipitated, extra.....	lb.	.05	@	
China clay, domestic (powdered).....	ton	25.00	@	30.00
imported (powdered).....	ton	50.00	@	60.00
Chrome, green.....	lb.	.14	@	.45
yellow.....	lb.	.23	@	.25
Cotton linters.....	lb.	Nominal		
Excellerex.....	lb.	.85	@	
Fossil flour.....	ton	65.00	@	
Gas black (cases).....	lb.	.28	@	.35
Gilsonite.....	ton	40.00	@	
Glue, high grade.....	lb.	.40	@	.60
medium.....	lb.	.30	@	.40
low grade.....	lb.	.24	@	.35
Glycerine, C. P. (drums).....	lb.	.59	@	.60
Graphite, flake (400 pound bbl.).....	lb.	.25	@	
amorphous.....	lb.	.07	@	
Green oxide of chromium (casks).....	lb.	.70	@	.80
Ground glass (fine).....	lb.	.65	@	
Hexamethylene Tetramine (powdered).....	lb.	.65	@	1.00
Indian red, reduced grades.....	lb.	.04 1/2	@	.08
pure.....	lb.	.09	@	.11
Infusorial earth, powdered.....	ton	61.00	@	
botted.....	ton	65.00	@	70.00
Iron oxide, red, reduced grades.....	lb.	.02 1/2	@	.04
red, pure, bright.....	lb.	.11	@	.14
red, excelsior.....	lb.	.18	@	
Ivory, black.....	lb.	.07	@	.10

Lampblack.....	lb.	.05	@	.13
Lead, red oxide of.....	lb.	.12	@	.12 1/2
sublimed blue.....	lb.	.10	@	.10 1/2
sublimed white.....	lb.	.10	@	.10 1/2
white, basic carbonate.....	lb.	.10 1/2	@	
white, basic sulphate.....	lb.	.10	@	
black hyposulphite (Black Hypo).....	lb.	Nominal		
Lime, flour.....	lb.	.01 1/2	@	.02
Litharge, domestic.....	lb.	.12 1/2	@	.12 1/2
English.....	lb.	.12	@	.13
sublimed.....	lb.	.11 1/2	@	.12
Lithopone, imported.....	lb.	.10	@	.14
domestic.....	lb.	.06 1/2	@	.07
Beckton white (carloads).....	lb.	Nominal		
Magnesia, carbonate.....	lb.	.12	@	.13
calcined, heavy.....	lb.	.10 1/2	@	.11 1/2
calcined, heavy, Thistle Brand.....	lb.	.14	@	
light.....	lb.	.45	@	.50
Magnesite, calcined, powdered.....	ton	60.00	@	70.00
Mica, powdered.....	lb.	.03 1/2	@	.05
Mineral rubber.....	lb.	.03 1/2	@	.05
"V. R. N.".....	ton	100.00	@	
"Genasco" (carloads).....	ton	Nominal		
"Pioneer".....	ton	45.00	@	48.00
"Richmond Brand".....	lb.	.03	@	
"New York Brand".....	ton	40.00	@	
"Refined Flatent".....	lb.	.05	@	
"Rubrax".....	ton	Nominal		
Naphtha, stove gasoline (steel bbls.).....	gal.	.24	@	
66@68 degrees (steel bbls.).....	gal.	.29	@	
68@70 degrees (steel bbls.).....	gal.	.30	@	
V. M. & P. (steel bbls.).....	gal.	.23	@	
Oil, aniline.....	lb.	.32	@	.33
corn, refined (Argo).....	cwt.	16.76	@	
linseed (bbl.).....	gal.	1.35	@	1.38
palm.....	gal.	.16	@	.17 1/2
paraffin.....	gal.	Nominal		
pine (cases).....	gal.	.58	@	
rapeseed, blown.....	gal.	1.50	@	1.60
rosin.....	gal.	.37	@	.67
tar (cases).....	gal.	.26	@	.32
soluble aniline colors, yellow, orange.....	lb.	2.50	@	
Orange mineral, domestic.....	lb.	.14	@	
Paragol (carloads).....	cwt.	11.64	@	
Petrolatum.....	lb.	.05	@	
Petroleum grease.....	lb.	.03 1/2	@	
Pine solvent.....	lb.	Nominal		
Pine tar retort.....	bbl.	10.50	@	
Pitch, burgundy.....	lb.	.04 1/2	@	.06
coal tar.....	lb.	.01	@	
pine tar.....	lb.	.02 1/2	@	
Plaster of paris.....	bbl.	2.00	@	3.00
Prussian blue.....	lb.	.75	@	.80
Pumice stone, powdered (bbls.).....	lb.	.03 1/2	@	
Reclaimed rubber, Standard shoe reclaim.....	lb.	.16 1/2	@	.16 1/2
Standard tire reclaim.....	lb.	.20	@	.20 1/2
Resin, Pontianak, refined.....	lb.	Nominal		
granulated.....	lb.	Nominal		
fused.....	lb.	Nominal		
Rosin, K.....	bbl.	6.75	@	
Rotten stone, powdered.....	lb.	.02 1/2	@	.04
Rubber black.....	lb.	.06	@	
Rubber substitute, black.....	lb.	.09 1/2	@	.13 1/2
white.....	lb.	.15	@	.19
brown.....	lb.	.15	@	.19
.....	lb.	.35	@	.37
Rubhide.....	lb.	.68	@	
Shellac, fine orange.....	lb.	.21	@	35.00
Silex (silica).....	ton	8.50	@	16.00
Soapstone, powdered.....	ton	8.50	@	16.00
Starch, corn, powdered.....	cwt.	5.50	@	
Sulphur chloride (drums).....	lb.	.08 1/2	@	.09 1/2
Sulphur, flour, velvet brand (carloads).....	cwt.	2.90	@	2.95
Bergenport flour.....	cwt.	2.95	@	3.35
Talc, American.....	ton	8.50	@	15.00
French.....	ton	24.00	@	28.00
Toluol, pure.....	gal.	1.75	@	2.00
Tripoli earth, powdered.....	ton	60.00	@	
botted.....	ton	65.00	@	70.00
Turpentine, pure gum spirits.....	gal.	.47	@	
wood.....	gal.	.42	@	
Venice.....	lb.	.08	@	
Ultramarine blue.....	lb.	.25	@	.45
Vermilion.....	lb.	.70	@	.80
Chinese.....	lb.	.95	@	1.00
English.....	lb.	1.75	@	
Wax, beeswax, white.....	lb.	.63	@	.65
ceresin, white.....	lb.	.12	@	.20
carnauba.....	lb.	.41	@	.55
ozokerite, black.....	lb.	.45	@	.60
green.....	lb.	.70	@	.75
montan.....	lb.	.33	@	
paraffin, refined 118/120 m. p. (cases).....	lb.	.09 1/2	@	
123/125 m. p. (cases).....	lb.	.10	@	
128/130 m. p. (cases).....	lb.	.11	@	
133/136 m. p. (cases).....	lb.	.12 1/2	@	
Whiting, Alba.....	cwt.	1.00	@	1.25
commercial.....	cwt.	.95	@	
gilders.....	cwt.	1.00	@	1.25
Paris, white, American.....	cwt.	1.25	@	1.50
English cliffstone.....	cwt.	1.50	@	1.75
Wood pulp XXX (carloads).....	ton	Nominal		
Yellow ochre.....	lb.	.04	@	
india rubber.....	lb.	1.50	@	
Zinc oxide, American process, horsehead brand.....	lb.	.10	@	
"XX red".....	lb.	.10	@	
"XX white".....	lb.	.10	@	
French process, red seal.....	lb.	.15 1/2	@	
green seal.....	lb.	.15 1/2	@	
white seal.....	lb.	.16 1/2	@	
Zinc substitutes.....	lb.	Nominal		
Zinc sulphide, pure.....	lb.	Nominal		
Yellow.....	lb.	Nominal		



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Published on the 1st of each month by

THE INDIA RUBBER PUBLISHING CO.

No. 25 West 45th Street, New York.

Telephone—Bryant 2576.

CABLE ADDRESS: IRWORLD, NEW YORK.

HENRY C. PEARSON, Editor

Vol. 56

JULY 1, 1917

No. 4

SUBSCRIPTIONS: \$3.00 per year, \$1.75 for six months, postpaid, for the United States and dependencies and Mexico. To the Dominion of Canada and all other countries, \$3.50 (or equivalent funds) per year, postpaid.

ADVERTISING: Rates will be made known on application.

REMITTANCES: Should always be made by bank draft or Postoffice or Express money order on New York, payable to THE INDIA RUBBER PUBLISHING COMPANY. Remittances for foreign subscriptions should be sent by International Postal Order, payable as above.

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Entered at the New York postoffice as mail matter of the second class.

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SOME WAR DON'TS.

DON'T fail to join and support the Red Cross. Whether Pro-Ally or Pro-Turk, Protestant, Catholic or Pagan, Democrat, Republican or Free Soiler, Patriot, Traitor or Common Coward, you can do this at least with a clear conscience.

Don't think your Liberty Bond lets you out. It lets you in for greater effort.

Don't waste anything—food, clothing, time, effort, money, words.

Don't let your neighbor's stinginess bother you—cure your own.

Don't be peeved if the other fellow gets all the glory—you know what you did.

Don't fail to thank God daily that you can walk unafraid—that a wall of Allied steel makes this possible. Thank offerings are the best of Thank-Gods.

IT IS THE LONG RUN THAT TELLS.

THE United States has rallied with characteristic fervor to the defense of freedom and democracy. Patriotism prevails; preparedness is going forward speedily; the Liberty Loan is a success, and men, women and children in every walk of life are doing something for the country they love. Such a generous response has been easy of accomplishment because as yet it has entailed no great sacrifices. But it must not be forgotten that there will be other drafts, other bond issues, still higher cost of living and perhaps more drastic taxes, for the conviction grows that the war will not be a short one. Training, munitioning, preparedness generally, is a joyous business as compared with actual armed conflict, and with the waning of the first enthusiasm and the inevitable toll of American youth our ardor must not be permitted to languish nor our determination to falter.

This is the greatest undertaking the American people have ever engaged upon and as time passes the part we are destined to play in forcing a triumphant decision ever looms larger. It is not hasty, demonstrative action to-day that will win the war, but constant, consistent, concerted effort of the whole people. Every industry, every class must do its share and persist until the end. The rubber industry has begun nobly and we believe will so continue; indeed, it is already accomplishing much of which the public, even the trade in general, knows nothing. THE INDIA RUBBER WORLD, therefore, desires to publish a permanent monthly record of what the rubber firms of the country are doing to meet this great national crisis and of every patriotic act of employers and employes alike that will tend to maintain enthusiasm for the national defense.

Practical patriotism in one factory, store or office stimulates like acts elsewhere and by the dissemination of such news we can perform a measure of service. Our readers are therefore urged to send to us for publication particulars and personnel of all patriotic movements and also individual participation in the war in order that this record of honor for the rubber industry may be complete.

THE STIMULUS OF WAR.

THOSE who fear that the war may bring disaster to the American rubber industry will do well to study the present situation in England as forecasting what may reasonably be expected here. For example, the annual report of J. Mandleberg & Co., Limited, waterproofers, Manchester, England, published early in May, shows that the business was never more prosperous. According to a tabular record of this company for the past 19 years the net profits for 1914, 1915 and 1916 were respectively £49,200, £71,000, £86,700; ordinary dividends, 15, 20, 20 per cent; depreciation allowance, £2,800, £3,500, £3,500; reserve allowance, nil, nil, £10,000; carried forward, £31,000, £49,100, £72,900. Thus the 1916 profit increase over 1915, itself a remarkable year in the

company's history, was £15,700. For the third time within seven years a share bonus of £60,000 has accordingly been capitalized and distributed to the ordinary shareholders, one new share for every four formerly held. Sixty per cent of the existing ordinary capital now consists of bonus shares.

It is logical to suppose that the American rubber industry, which plays such an important part in munitioning our armies, will feel the same stimulus of war. Labor troubles may cause some hardship at first, although as in England certain lines of rubber manufacture will probably figure among the exempted occupations, but eventually, as in all the belligerent countries of Europe, women will come to the rescue in a much wider field of employment than hitherto.

AMERICAN GROWN PARA RUBBER.

THERE has in the past been a decided doubt in minds of many regarding the possibility of cultivating *Hevea* successfully in any American possession, even in the Philippines. This doubt has often taken the form of vigorous statement, but more frequently of a quiet but effective lack of interest on the part of rubber men, scientists and planters. There were those, however, that believed in such planting and were ready to put in time and money to prove themselves right. And they have succeeded. On one of the Southern islands, Basilian, close to the great tropical land of Mindanao, is a plantation of Para rubber that tree for tree is the equal of any. There are 70,000 trees just beginning to bear and this year they have already produced more than 50,000 pounds of crêpe of the best quality, which sold for the highest price in the market. The cost per pound is incidentally said to be a trifle less than is the cost of production in the Malay States.

If 70,000 trees, why not 700,000 or 70,000,000?

THE STABILITY OF THE TIRE BUSINESS.

CAPTAINS of the American rubber industry believe that the experience of Canada should dispel any doubts concerning the stability of the motor car and tire business of the United States as affected by the war. Canada has gone through the same conditions that now confront us, and after two and one-half years of warfare general business is very good, notwithstanding the constant crusade for economy and the great drain of money and men, the latter equivalent to a United States force of 7,500,000. According to a canvass just completed by G. M. Stadelman, vice-president of The Goodyear Tire & Rubber Co., Canada, with a population of only 8,000,000, is buying 100,000 new cars, almost five times as many as were purchased during 1914, and an increase of 85 per cent over the normal growth of 38 and 36 per cent respectively for 1913 and 1914. Her purchase with only about one-fifteenth the population of the United States is equivalent to our purchase of 1,500,000 auto-

mobiles, which is just about what motor car manufacturers estimate that this country will buy during 1917. This means 6,000,000 tires for this equipment alone.

THE RUBBER CLUB OUTING ABANDONED.

SINCE its inception in 1900 the Rubber Club, now The Rubber Association of America, has enjoyed an unbroken series of midsummer outings. This year, however, with commendable regard for the seriousness of the times and the amount of human suffering every dollar will alleviate, it has decided to forego this annual event and contribute the money usually subscribed for that purpose to the Red Cross or some equally worthy cause. This is in line with the abandonment of the mid-winter banquet of 1915, when the amount that would otherwise have been spent in feasting was sent to starving Belgians.

GOODYEAR, CONNECTICUT.

IT IS PECULIARLY FITTING THAT CONNECTICUT SHOULD have a town named Goodyear, for it was in that state that Charles Goodyear was born and lived most of his ambitious life in poverty. His process of vulcanization ranks among the greatest discoveries of all ages, yet like many another inventor, he profited little by it, although it has accumulated fortunes for later generations and proved a boon to mankind generally. Government designation of the post office, formerly Killingly, as Goodyear, constitutes an official recognition of genius and an enduring memorial to persistence crowned by ultimate success. It will serve in a measure to keep his memory fresh in the minds of all whose livelihood depends upon his early researches.

BICYCLE RIDING IS ON THE INCREASE.

TRADE papers state that 600,000 bicycles were manufactured in 1916 against half that number the preceding year. More would have been made but for the shortage of tubing and labor. Manufacturers expect to produce 1,000,000 bicycles this year, a gross business of \$25,000,000, of which \$5,000,000 represents 2,000,000 tires.

THAT THE AMERICAN RUBBER TRADE IS THOROUGHLY abreast of the times is shown by the fact that four of the foremost rubber companies, the United States Rubber Co., the Goodrich, Goodyear and Hodgman companies, are fully equipped, mechanically and technically, to produce coated fabrics for war balloons, of which our Government will require very many.

CANADIAN IMPORTS of rubber, gutta percha, etc., for the fiscal year ending March 31, 1917, were \$5,767,508 from the United States and \$3,636,066 from Great Britain. During the year, automobiles to the value of nearly \$9,000,000 were imported from the United States.

What I Saw in the Philippines—I.

By the Editor of The India Rubber World.

Primary Reasons for the Trip.—The Influence of Smith—Mine Own and Others' Ignorance.—Honolulu in Passing—The Venezuela—History of the Philippines.—A Day in Yokohama.—Smoking Room Wisdom.—Side Lights on the Filipinos.

IN the month of December, 1916, a man threatened to cut my throat and I fled to the Pacific Coast and there embarked on the Pacific Mail steamship "Venezuela" for the Philippines. I should perhaps explain that he was neither insane nor blood-thirsty, but simply a surgeon who collected tonsils. Mine were a bit bothersome, but as they were the only set I had I did not feel like sparing them, particularly as he had plenty of others in glass jars accumulated during years of predatory physicianing. So I fled and before I got to Manila my throat was in such good shape that I had to hire a Chinese steward to cough just to make me feel that I was back enjoying a New England winter.

Of course, "it wasn't the cough that carried me off" entirely.

I really had a very definite object, indeed a series of objects. For a long time I had been gathering in the opinions of long distance experts upon conditions in the Philippines, and it was slowly dawning upon me that it was possible that they did not wholly know what they were talking about. The statements that no white man could live there, that no labor was available, that Para rubber could not

be successfully cultivated, and so on, struck me as not being backed up by facts. Besides there was Smith. He always has definite ideas, and is always wrong. For example, he predicted in 1904 that plantation rubber would never reach 1,000 tons a year; that it would never really pay any rubber company to employ a chemist; that the double tube tire would never be adopted by American motorists; and in 1911 that rubber would never again go above 60 cents a pound. As a final test I had therefore gone to him with:

"I wonder if it would be possible to cultivate Para rubber in any part of our Philippine possessions!"

"Not a chance. I looked into that thor——"

I knew then that it was well worth my while to see the land that would one day produce most of our plantation rubber.

There was also my belief that the psychological time had arrived for such a trip. My visit to Ceylon and Singapore in 1904 bore some fruit in the United States, much more in Europe. With the greatly increased knowledge of American rubber men concerning foreign parts, would not an impartial view of possible rubber planting sections be at least readable and possibly profitable?

Pondering my fellow countrymen and their knowledge of the Island Empire of the Pacific, they group themselves about as follows:

Those who do not know whether the Philippines is one of Paul's epistles, or the plural of philopena, and—

Real observers, scientific and commercial, whose conclusions are in the main sound and anyhow are always worthy of careful attention.

Of course, between these extremes is to be found a host that possess a weird and appalling variety of misconceptions concerning the islands and the people.

Speaking of the ignorance of others I must fain confess that

my own was considerable. It is difficult for me to get an idea of size from a map. As an extreme example I know that Australia is vast. Its measurements tell one so, but until I visit it and experience the magnificent distances it will always remain subconsciously a small square daub down in a lower corner of the map. So it was with the Philippines. Until I visited them they were big islands accord-



HONOLULU FROM THE GOLF CLUB.

ing to description, but my imagination relegated them to the little things like the lesser Antilles or the Azores. Further than this there was always the mental effort in locating Manila, as to whether it was on Panay or Luzon; whether it was Mindoro or Mindapao that was the big southern land, and if Cebu were a hump-backed ox and Zebu an island.

It is, of course, exceedingly difficult to get accurate information concerning matters at a distance on any subject, but concerning rubber it is almost hopeless. From what I knew of the southern of the Philippine Islands I was convinced that there were great plantation possibilities, but it was difficult to prove. I had paid a goodly fee to a young man who was voyaging thither to gain for me accurate information regarding conditions, but his report, long delayed, was of no value. He began by believing what someone in Manila told him, that rubber could not be grown, and nothing else mattered. During his journey through the Southern islands he found nothing, because that was what he expected to find. He acknowledged that soil, climate, rainfall, everything pointed to a paradise for *Hevea* but "it wouldn't grow!" As to the "why" he had no adequate answer.

To my surprise I found that many business and scientific men

returning from the Philippines were of the same opinion. But they did not say why, at least if they had any reason it did not appear to be sound.

We went ashore at Yokohama and took a motor to take us about the city in a motor, visit the Golf Club, and meet at luncheon numbers of delightful people. He and his family have large rubber plantations in the Philippine Malay States, so there was much to talk about.

Just a word about our boat: Eastern transportation experts had scoffed at the idea of comfort on any Pacific boats other than the big English or Japanese liners. They evidently did not know the "Venezuela," of the Pacific Mail, and owned by Americans. She was a new, sturdy, perfectly equipped passenger boat, a bit slow, thirteen knots being her best. An oil burner, she was unusually clean, and with the American and Scandinavian officers, her tidy Chinese stewards, Filipino band, and passengers bound for all parts of the Orient, the setting was full of variety and interest. English boats as a rule are noted for the spirit of camaraderie that exists and that shows in the deck sports in which all take part, while American boats have in the past been singularly lacking in this. The "Venezuela," however, was an exception. Deck golf, shuffleboard, and dozens of sea sports were in full blast all day long, and old and young participated with the greatest enthusiasm. I wanted to be absolutely ashore, so I fairly lived on deck.

If, as the Romans believed, the seat of the intellect is in the stomach, a three-week voyage on the heaving Pacific is not conducive to an open mind. I felt that the first week that I was approaching my subject absolutely empty of prejudice.

As a preliminary to my investigation I posted up on the history of the islands. It is this as far as we are concerned:

Discovered by Magellan in 1521.

Recovered by Dewey in 1899.

Covered by the Republican Party in 1900.

Uncovered by the Democratic Party in 1912.

That there was a great war in progress we hardly realized. That unusual precautions were being taken, the care with which passports were issued proved. Then, too, when we visited Japanese ports our few German passengers went ashore only in the

care of dapper Japanese detectives. Our wireless news was scrappy and unsatisfactory. The majority of the passengers believed in the final and deserved triumph of the Allies, and those who did not kept it to themselves as far as they could.

At Yokohama another old friend, Kenzo Okada, who some 20 years ago worked in the Apsley factory in Hudson and the Home factory in Trenton, and who is now at the head of a large rubber mill of his own, gave us a luncheon *à la Japonaise*. It was delightful. Okada had also been interested in a rubber planting scheme in Formosa which he reported had not been a success, the island lying too far north to grow *Hevea* successfully.

Did I say our boat was a rubber carrier loading big cargoes at Hongkong and discharging at San Francisco? Also that the smoking room crowd contained men that knew much of plantation companies and affairs in Singapore, and the Malay States? To talk with some of them was almost as good as a visit to the great plantation countries.

As a rule the talk was the shipping situation, and that there was not in sight a fleet of cargo carriers big enough to take care of the rubber accumulating on the plantations and in the rubber ports. Said one of them:

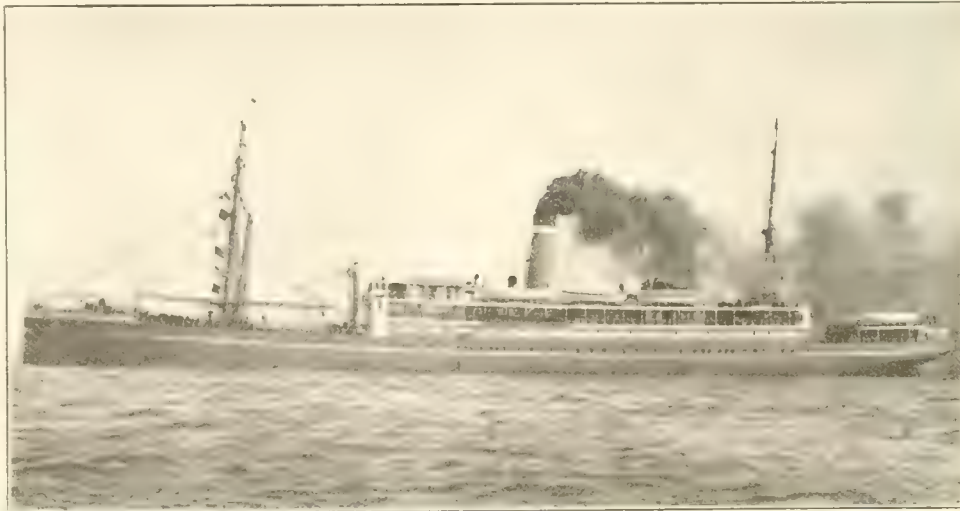
"New York is bound to be out of it for a while at least. German submarines in the Mediterranean and the Atlantic are getting too many ships. The result is that all of the nations whose boats have been sunk are steadily withdrawing freighters from the Pacific and using them at home. Japan is of course increasing her fleet, but she will be called upon to send cargo carriers to the danger zones ere long. Even then the United States cannot depend upon London for rubber,

but must look to Singapore. Not only is this so, but it must be boats that come to United States ports, for the Canadian railroads are bound to be congested and unable to handle our rubber. The godowns in the rubber ports are carrying more rubber than ever before. Then there is the question of permits which is hard to arrange so that they coincide with available cargo space. And beyond all this is the difficulty in financing purchases. What we need is an American line of direct boats, perhaps touching at Manila, and we need them in a hurry."

Curiously enough it was ships, ships and more ships that all were talking, and, getting ahead of my story, from December to April in the Pacific, in the Sulu sea, in Manila and in San



THE SHUFFLEBOARD FINALS.



THE STEAMSHIP "VENEZUELA."

Francisco it was the same. Indeed the last words on the subject spoken in Honolulu and later in San Francisco were by the secretary of the Mansfield Rubber Co., who was just returning from a visit to the rubber plantations in the Far East. His plan was for the rubber and automobile companies to combine in owning their own cargo carriers. They were to be wooden ships of about 3,000 tons each, to carry any freight that seemed profitable but to give preference to automobiles going out and rubber com-



THE FAMOUS COLEMAN CARTOON.

ing back. They were to be oil burning, costing some \$400,000 each. The plan was to incorporate "The Rubber & Automobile Freight Line," capitalized at \$9,000,000. Of this \$4,000,000 to be 6 per cent preferred stock, to be sold at par and to carry one share of common as a bonus, leaving \$1,000,000 in the treasury for promotion purposes. A point was that each automobile or rubber stockholder was to have a preference as to cargo space proportioned to his stock holdings.

Side lights on the Filipinos also were constantly being thrown by what the passengers returning to the islands said. For instance:

"The Filipinos would be the worst scared bunch in the world if Uncle Sam really let go," said one who knew. "They are as independent to-day as are the natives of Massachusetts and they know it. The leaders don't want it, and the mass of the people would not have it. Only a few restless sore-heads wish it, so that they could get a chance to graft and loot. Did you ever see Coleman's cartoon of the war scare? That was what epitomized the end of the independence movement. They woke up then, and in a few years they will all be ardent Americans, indeed the mass of them are to-day."

(To be continued)

TRADE JOURNAL PUBLISHERS HELP ENLISTMENTS.

The New York Business Publishers Association, which includes in its membership the leading trade journals published in New York City has been maintaining 45 recruiting stations securing enlistments at the rate of 300 daily. Governor Whitman at a meeting at the Yale Club, June 15, personally thanked the members for their patriotism and activity.

The trade press of New York City now has three members in the War Economy Committee: Charles G. Phillips, of the *Dry Goods Economist*; Louis Hahn, of *Women's Wear*, and Roger W. Allen, of the *American Hatter*. These will report to the Commerce Economy Board of the Council of National Defense.

ALL EXPORTS UNDER GOVERNMENT CONTROL.

THE Espionage Law with its embargo clause giving the President power to control all exports, including crude and manufactured rubber, effects the complete incorporation of the United States into the allied economic strength and gives the alliance practical trade domination of the world. This law prevents supplies from reaching the enemy through neutral countries, conserves all American resources for American and allied use, and befriends neutrals agreeable to the alliance. It also removes the necessity of the British blockade, as the United States, with the aid of British machinery established during the past three years, is in a position to see that neutrals contiguous to Germany are supplied with just enough food and materials for their own needs. The exercise of this new power over exports will in turn force the release of much needed raw materials controlled by the Allies which heretofore have been permitted to come to America only in limited quantities.

Fair control over shipping will result. As administered, the act will require licenses for export cargoes and under this arrangement the government can force neutral ships from harbors where they have sought safety from submarine attack into service to transport cargoes wanted by their home countries. American and Allies' shipping, too, can be requested to carry cargoes to the destinations the government considers should be supplied for a proper conduct of the war.

INSULATED WIRE AND CABLE MANUFACTURERS FACILITATE GOVERNMENT ORDERS.

RECENTLY when the Navy Department urgently required 1,000,000 feet of No. 14 Duplex leaded cable in 30 days' time, the usual procedure of securing bids according to established specifications was set aside, and the order was delivered promptly. Representatives of the principal wire concerns were called to Washington for a consultation, resulting in a unique plan that fully provided for the exigencies of the occasion. A Wire and Cable Committee of the Advisory Commission of the National Council for Defense was appointed, consisting of Le Roy Clark, Safety Insulated Wire & Cable Co., New York City, chairman; Wallace S. Clark, General Electric Co., Schenectady, New York; Edward Sawyer, Atlantic Insulated Wire & Cable Co., New York City. Schedules of Government requirements are submitted and the committee nominates the manufacturer and suggests the price for the goods. Thus the usual red tape is for the time being eliminated and insulated wire and cable supplies are being delivered to the Government without delay.

GOVERNMENT FOOTWEAR PROPOSALS.

The Bureau of Supplies and Accounts, of the Navy Department, has received proposals for the supply of gymnasium shoes and rubber boots as follows: 273,400 pairs of gymnasium shoes, in accordance with specifications, John Wanamaker, New York City, \$0.97 per pair, and United States Rubber Co., New York City, \$1.03 per pair. Additional bids of \$0.93 and \$0.80 per pair, as per samples, were received; 81,296 pairs of rubber boots, in accordance with specifications, Hood Rubber Co., Watertown, Massachusetts, sample No. 1, \$178,451.52, sample No. 2, \$165,651.20, United States Rubber Co., New York City, \$183,722.24 for amount as specified and additional bids in accordance with amended specifications \$2.37 and \$2.24 per pair, and as per sample No. 1 \$2.55, sample No. 2 \$2.24, and sample No. 3 \$2.44 per pair. Mishawaka Woolen Manufacturing Co., Mishawaka, Indiana, 9,410 pairs only at \$26.217 as per sample; The Southern Sales Co., Akron, Ohio, 24,000 pairs only at \$56.400.

War News of the Rubber Industry.

THROUGHOUT the country the rubber industry is answering nobly to the nation's call in a great emergency.

Many of its young men, including heads of companies, have voluntarily enlisted in various branches of military service, and thousands more will respond proudly to the selective draft. Leaders of the rubber trade are devoting their time, energy and expert knowledge without stint or compensation to the grave problems concerning the maintenance of the industry, the immediate and constant supply of government needs, and the care of war dependents. Concerns, large and small, and individuals whose duty lies in continuing their usual daily tasks with redoubled zest and efficiency have, even to the humblest worker, subscribed to the Liberty Loan and contributed to the Red Cross with eagerness and generosity. Thriving Akron, Ohio, with its large and growing foreign population has gone on record for a higher honor than that of merely being the rubber city of the United States.

Would that press dispatches made possible a complete statement of what has already been accomplished, but it is hoped that the editorial request for facts on another page of this issue will meet with wide response in order that this permanent monthly record of honor may leave unmentioned no act of loyalty and patriotism, corporate or individual, that will tend to maintain the present enthusiasm for the ultimate victory of the democratic peoples of the world, whatever sacrifices and hardships may intervene.

THE LIBERTY LOAN.

The rubber concerns of the country looked upon the floating of the Liberty Loan as at once a duty and a privilege. Several of them invested heavily and practically all did something. Many also negotiated bonds for their employes on a deferred payment plan to enable them to participate in the loan as a form of weekly savings. The appended list records only such instances as have come to our attention through letters and the daily press. It is far from complete and it would be a pleasure to list the total subscription for every firm in the industry.

The United States Rubber Co., New York City, heads the list with a total subscription of \$2,400,000, of which \$1,000,000 was taken by the firm and the balance by employes in the various factories and sales offices in different parts of the country.

Akron, Ohio, raised approximately \$4,000,000, or \$300,000 more than her quota, and outranks Cleveland and all other Ohio cities in per capita subscriptions. There are 40,000 subscribers, which means that one in every three persons contributed to the purchase of the bonds and that virtually every family of this cosmopolitan city is represented. It is estimated that close to 1,500 foreigners have contributed to the Liberty Loan Bonds.

Reports show that 7,000 employes of The B. F. Goodrich Co. took about \$750,000 worth of bonds.

Not less than 11,000 persons in the employ of The Goodyear Tire & Rubber Co. became bond buyers, the total subscription being about \$675,000.

Only five men of the 300 employes of the Mohawk Tire & Rubber Co. had not subscribed on June 14, and it is probable that they did so the last day, making a 100 per cent record for this firm.

The Firestone Tire & Rubber Co. encouraged every employe to subscribe to the extent of his ability and arranged

for payment at the rate of \$1 per week for those not able to comply with the government's terms.

F. W. Plant, president of the Plant Rubber Co., Minneapolis, Minnesota, served on a special committee to promote the sale of Liberty Bonds. Among the rubber jobbers who subscribed were the Plant Rubber Co., \$10,000; W. S. Nott Co., \$10,000, and the Minnesota Rubber Co., \$500. The employes of the Plant Rubber Co. subscribed \$3,000 on a deferred payment plan.

The Federal Rubber Co., Cudahy, Wisconsin, took a large block of bonds and worked out a plan whereby even the humblest worker might become the possessor of at least one bond.

The Simplex Wire & Cable Co., Boston, Massachusetts, bought \$50,000 worth of bonds and enabled their employes to subscribe at the rate of \$1 a week without charging any extra interest.

The Ajax Rubber Co., Inc., New York City, subscribed \$100,000 on its own account in addition to between \$300,000 and \$400,000 bought by employes.

The Republic Rubber Co. employes, Youngstown, Ohio, took advantage of the firm's deferred payment plan and subscribed generously.

Nearly 500 employes of The Fisk Rubber Co., Chicopee Falls, Massachusetts, bought over \$85,000 worth of bonds on a deferred payment plan of \$1 per week for each \$50.

On June 7 the employes of the Tyer Rubber Co., Andover, Massachusetts, had subscribed over \$16,000, some departments making records of 100 per cent.

The Davol Rubber Co., Providence, Rhode Island, subscribed for \$25,000 of the bonds, which have been sold to its employes on the weekly payment plan.

The Monatiquot Rubber Works Co., South Braintree, Massachusetts, offered its employes an opportunity to buy bonds on convenient terms, and the result was a subscription of \$60 per capita.

The staff of THE INDIA RUBBER WORLD subscribed \$11,560.

ALLIED INDUSTRIES ACTIVE.

Forty thousand employes of the General Electric Co. subscribed \$2,955,550. This total includes the subscriptions of general offices, district offices, the works at Schenectady, Lynn, Pittsfield, Erie and Fort Wayne, the Edison lamp works, Sprague works and National lamp works.

The Westinghouse Electric & Manufacturing Co. also negotiated bonds for all employes wishing to subscribe on monthly and semi-monthly instalments.

RUBBER MEN IN MILITARY SERVICE.

H. Wilfred du Puy, president and treasurer, and Charles M. du Puy, vice-president of the Pennsylvania Rubber Co., Jeannette, Pennsylvania, are in active service and now stationed at Fort Niagara.

One hundred and twenty-five men have left The Goodyear Tire & Rubber Co., Akron, Ohio, to enter Federal service; a part of them are members of the Guard of West Virginia. An even larger number will leave in July, when the Ohio National Guard will be called to the colors.

Fifteen men in the employ of F. H. Appleton & Son, Boston, Massachusetts, have enlisted, ten of them in Captain Appleton's own company.

Harold H. Everett, Mansfield, Massachusetts, for some time connected with the Boston office of The B. F. Goodrich Co.,

Akron, Ohio, has enlisted in the infantry and is now in training at Fort Slocum, New York.

Albert E. Plumb, B. C., has resigned from the laboratory staff of the Canadian Consolidated Rubber Co., Limited, Montreal, Canada, to enlist in the United States Army.

P. D. Jamieson, who was in charge of the footwear department at the Halifax branch of the Canadian Consolidated Rubber Co., Limited, is in training for overseas service at St. John's, P. Q.

INCREASING THE FOOD SUPPLY.

H. S. Firestone, president of the Firestone Tire & Rubber Co., Akron, Ohio, is personally superintending the care of 350 war gardens, 50 by 100 feet, which have been established by employes on 70 acres of land furnished by the company. The company provides the seed, and in order to insure maximum production an expert gardener has been employed to instruct the men in intensive farming.

President Rieder of the Canadian Consolidated Rubber Co., Limited, Montreal, Canada, has announced that, notwithstanding the fact that the company has orders on hand which would keep all the factories busy throughout the summer, all the factories would close one full week during the busy harvest season, so that farmers can be provided with help at that time.

THE RED CROSS.

The rubber industry is already responding generously to the appeal of this humanitarian cause. The customary Rubber Club outing has been abandoned, the money usually subscribed for the purpose probably to be contributed to the Red Cross. Leaders in the rubber industry in the several centers have taken the initiative, encouraging participation for employer and employe alike and conducting spirited, well-organized campaigns, as did New England for the Liberty Loan under the able leadership of Frederic C. Hood.

As a result of a four days' campaign early in June 98 per cent of the force of The Goodyear Tire & Rubber Co., Akron, Ohio, became members of the Red Cross. In all 17,865 new members were enrolled and a like number of dollars were contributed to the cause. This brings the total membership of Akron up to 40,000, or about 35 per cent of the city's population.

The Fisk Rubber Co., Chicopee Falls, Massachusetts, was among the early subscribers during Red Cross Week, having contributed \$10,000.

By an overwhelming majority the employes of the Pennsylvania Rubber Co., Jeannette, Pennsylvania, voted to abandon the annual outing provided by the company and to devote the appropriation of \$1,200 to the Red Cross. The company regards this not as its own gift, but as a contribution from its employes, whose generous and patriotic sentiment made possible the offering to a deserving cause.

A number of industrial corporations have declared special dividends, which they recommended be turned over to the Red Cross fund. Among these are the Ajax Rubber Co., Inc., New York City, \$14,200, and the Westinghouse Electric & Manufacturing Co., \$375,000. The General Electric Co. dividend for this purpose was \$1,000,000.

AKRON HAS A BIG PATRIOTIC DAY.

On May 28 the largest patriotic gathering ever held in Akron, Ohio, occurred in connection with the raising of the huge American flag which was purchased by popular subscription among the employes of The B. F. Goodrich Co. All of the officers of the company were present and Hon. Myron T. Herrick, former Governor of Ohio and recently Ambassador to France, was the speaker of the day. Homer H. McKeehan, of Cleveland, Ohio, also delivered a stirring address and a salute was fired by the firing squad of the Eighth Ohio Regiment of the National Guard.

The entire city took active part in the ceremonies, which were preceded by a parade three miles long. Every fraternal, civic, military and foreign organization was represented. For the first time in their history the Knights Templars took part in a public parade, wearing their full regalia. The Knights of Pythias, Knights of Columbus and the Odd Fellows appeared with their full uniformed ranks. A hundred thousand men, women and children of Akron and surrounding towns



IMMENSE FLAG RAISED BY GOODRICH WORKERS.

lined the route of march and 25,000 more filled the Goodrich Field to its capacity.

The most impressive scene during the parade was a division of foreigners headed by a band. Twenty-four different nationalities were represented in this division alone, and several foreign societies had called out hundreds of their members, who formed another division of their own. The impression made by this great demonstration upon the foreign-born population of the city was particularly noteworthy.

The Boy Scouts of Akron exhibited wonderful efficiency in aiding the city's police department in controlling the large crowds along the line of march and at the field.

COUNCIL OF NATIONAL DEFENSE.

As time passes it becomes increasingly evident that the Council of National Defense, not Congress, is putting the country on a war basis. Non-political business efficiency characterizes its every act, for the men composing it represent the best paid brains of America—manufacturers, captains of industry, railroad heads, labor leaders, professional men, experts of every sort whose ordinary incomes range anywhere from \$5,000 to \$100,000, who have placed their specialized ability at government service without compensation and in most instances are not even presenting expense bills. Such free tender of highly specialized service enables them to demand practical patriotism from others, and when they award contracts the plea for war profits goes unheeded. The advent through them of system, cooperation, standardization, adaptation of method to circumstance and introduction of reasoned order and priority into war tasks have wrought a veritable revolution in our national government which augurs well for the efficient conduct of the war.

The Council of National Defense itself consists of only six Cabinet members, while the Advisory Commission includes seven civilians, each a leader in his field. But so greatly have the Sec-

five Committees of the Commission developed that a pamphlet of 26 pages is required to list the members of this great organization. This list reads like a "Who's Who of Big Business," and many of the names are well known to the rubber and allied trades.

The Cooperative Committee on Rubber consists of H. Stuart Hotchkiss, president General Rubber Co., chairman; Frederic C. Hood, Hood Rubber Co., and Arthur H. Marks, The B. F. Goodrich Co.

The Cooperative Committee on Chemicals consists of Dr. William H. Nichols, General Chemical Co., chairman; Van H. Manning, Bureau of Mines; C. A. Richards, Department of Commerce.

Among the eight subcommittees may be mentioned that on acids, consisting of H. R. Grasselli, Grasselli Chemical Co., and Henry Howard, Merrimac Chemical Co.; that on alkalis with J. D. Pennock, Solvay Process Co., chairman; that on coal tar by-products with William H. Childs, president Barrett Co., chairman; and that on sulphur with Henry Whiton, president Union Sulphur Co., chairman.

Edgar Palmer, president New Jersey Zinc Co., heads the Cooperative Committee on Zinc consisting of eight members.

The Cooperative Committee on Copper consists of seven members, with J. D. Ryan, president Anaconda Copper Co., as chairman, while the Cooperative Committee on Lead includes six members headed by Clinton H. Clark, president St. Joseph Lead Co.

Lincoln Grant, of Wellington, Sears Co., heads the Cooperative Committee on Cotton Goods of thirteen men, among whom may be mentioned Harry L. Bailey, also of Wellington, Sears Co., and Spencer Turner, of Turner, Halsey Co.

Thomas F. Manville, president of H. W. Johns-Manville Co., is chairman of the Cooperative Committee on Asbestos, Magnesite and Roofing.

Theodore N. Vail, president of the American Telephone & Telegraph Co., is chairman of a committee of five on telegraphs and telephones.

F. C. Pratt, of the General Electric Co., heads a subcommittee of the General Munitions Board on gages, dies, etc.

L. A. Osborne, vice-president of the Westinghouse Electric & Manufacturing Co., is chairman of the Cooperative Committee from the National Industrial Conference Board.

THE CARE OF ARMY AND NAVY DEPENDENTS.

IN response to the request of Secretary of War Baker to investigate the matter of voluntary civilian assistance in the care of dependent families of enlisted men in the military and naval forces, a committee of the Chamber of Commerce of the United States, of which F. A. Seiberling, president of The Goodyear Tire & Rubber Co., Akron, Ohio, is chairman, has made recommendations which must be regarded as good and fair to all. It is suggested that the government enact legislation providing for reasonable separation allowances similar to those adopted by England and Canada, and further, that the government officially designate some national organization to raise a general fund by voluntary public subscription and in co-operation with representative local bodies to distribute it for the alleviation of conditions not adequately met by national or state allowances. The committee urges prompt action by the government and speedy publication of the general plan, pending which employers should make only temporary commitments to the dependents of their operatives who enlist, it being realized that the smaller employers, who are in the majority throughout the country, cannot follow the lead of large firms and assume this burden generally or indefinitely without hardship and embarrassment.

In Great Britain there are two sources of revenue for dependents

First, the family receives from the government a separation allowance of \$2.25 a week for the wife or mother, \$1.25 for the first child, 84 cents for the second and 50 cents for each additional child. Widowed mothers and dependent sisters of single men are entitled to separation allowances where pre-enlistment maintenance existed.

Second, the soldier or sailor may allot part of his military pay, not exceeding three-fourths, for the support of dependents. In addition, and within certain limits (\$3 a week for a private or corporal; \$3.60 for a sergeant; \$3.96 for a company quartermaster sergeant; \$5.28 for a warrant officer, Class 2, and \$5.52 for a warrant officer, Class 1), the government will assist an unmarried soldier to continue the support he formerly gave dependents, not including his own maintenance, provided he will contribute approximately one-third of the amount (84 cents a week for private or corporal; \$1.40 for a sergeant, etc.) by allotment from his military pay, the government paying the balance. No person who is entitled to a separation allowance as the wife or child of a soldier can draw an allowance as a dependent in addition.

These allowances do not eliminate the necessity for relief efforts on the part of public organizations, such as the Soldiers' and Sailors' Relief Society, etc., whose voluntary workers and local committees take care of cases seeming to demand special assistance.

In Canada there are three sources of revenue for dependents:

First, a portion of the soldier's or sailor's pay, the percentage determined by individual conditions, is deducted and sent to his dependents.

Second, the government makes a separation allowance intended to enable dependents to approximate the pre-enlistment maintenance standard. This represents a flat sum of \$20 each for the wife and each child regardless of the size of the family.

Third, there is a National Patriotic Fund, raised by voluntary public subscription and distributed by a corporate organization authorized by the government. This fund takes care of necessitous cases where local investigation seems to establish the need of it.

SCHEDULE OF PAYMENTS TO CANADIAN DEPENDENTS			
	Government Separation Allowance.	Assigned Pay.	Patriotic Fund.
Wife, leaving no children	\$0	\$15 or more	\$5.00
Wife and one child			
Child under 5 years		15 or more	13.00
Child under 10 years		15 or more	14.50
Child under 15 years		15 or more	17.50
Wife and two children			
If both under 5 years	20	15 or more	16.00
If one under 5 and one under 10	20	15 or more	17.50
If both under 10 years	20	15 or more	17.50
If both under 15 or one less and one more than 10	20	15 or more	22.00
Wife and three children			
If all are under 5 years	20	15 or more	19.00
If all three are under 10 years	20	15 or more	20.50
If all three are under 15 years	20	15 or more	25.00

This scale continues up to the case of a wife with seven or more children. In such cases the maximum allowance from the Patriotic Fund is \$30 per month, regardless of the number or the ages of the children.

WIDOWED MOTHER. If she depended entirely for support on an unmarried son who has joined the Canadian Expeditionary forces, she may, if in need, receive from the Canadian Patriotic Fund a monthly allowance not to exceed \$10.

PARENTS. If the parents of a soldier in the Canadian Expeditionary forces are both old and incapable of work, and if they were entirely dependent on the soldier, they may, if in need, receive from the Canadian Patriotic Fund a monthly allowance not to exceed \$20.

Owing to the high cost of living the allowances in both countries have been found inadequate, and readjustments are now contemplated, their fundamental aim being to establish equality in the basis of service in the ranks; to equalize the burden upon industry and people; to avoid duplication of

patriotic organizations and funds, and to combine all the machinery of family maintenance with an eye to the psychological effect upon the soldier at the front. The plan of the United States when finally adopted will certainly not fall short of that of either England or Canada in generosity.

SENATE REMOVES ALL RUBBER DUTIES AND TAXES.

AS revised by the Senate Finance Committee, following a hearing granted to the Legislative Committee of The Rubber Association of America on May 5, the proposed 10 per cent ad valorem tax has been struck out of the War Revenue Bill now before Congress, and the Senate bill, as it now stands, provides for no duty on crude rubber nor tax on tires or other rubber manufactures. Instead, a tax will be imposed on automobile owners, the amount to be determined by the price of the car and the number of years it has been in service. It is the general belief that these provisions will be concurred in by the House and enacted into the final law.

At the hearing representative rubber men expressed their willingness to be taxed, but united in opposing the House proposal of double taxation on tires and a ten per cent duty on crude rubber, in addition to the general tax on corporations.

F. A. Seiberling, president of the Goodyear Tire & Rubber Co., Akron, Ohio, stated that the rubber industry is very glad to be taxed its full share and, he thought, a little more. He pointed out, however, the injustice of singling out tires, representing \$250,000,000 out of a \$600,000,000 annual business, for double taxation; made it clear that tires can no longer be regarded as a luxury, and advocated a 5 per cent war tax on all rubber manufactures as being more equitable and raising more revenue than a 10 per cent ad valorem import duty on crude rubber. The latter provision, he stated, would curtail importation and greatly increase the difficulties in the way of replenishing the present depleted American stocks, all of which have to be brought from the other side of the world, notwithstanding the submarine menace and the shortage of ships.

H. Stuart Hotchkiss, chairman of the Rubber Committee of the Council of National Defense, emphasized the seriousness of the present crude rubber situation in the United States, pointing out that whereas in normal times there is three months' supply of rubber at the mills, at present there is only 30 days' supply, with 17 days' supply in transit and 29 days' supply permitted at ports of origin. He also voiced the fear that an import tax in the circumstances might tend to curtail importations at a time when they are absolutely essential as a matter of national insurance.

Former Congressman Martin W. Littleton, of New York City, spoke for the retention of the original tariff free list, and suggested various amendments to raise the desired revenue without resorting to the crude rubber import duty, among them a 5 per cent tax on all rubber manufactures as well as tires.

GUTTA PERCHA USED IN ORDNANCE MAKING.

That rubber occupies a prominent position in the list of materials indispensable in modern warfare is a well-known fact. While the peculiar properties of gutta percha have made it a valuable material in the manufacture of various war supplies, it is now found useful in the manufacture of ordnance.

Gutta percha is used for the purpose of making a critical examination of any desired surface of the interior of the bore of rifle cannons. In order to do this, a block of wood is prepared so that one side approximately fits the bore at the part to be examined. This surface of the block is then coated with gutta percha and heated so that when it is inserted in the bore and forced against the part to be examined, it makes a negative

reproduction of the surface of the bore. The block of wood is allowed to remain until the gutta percha is cooled, when it is removed and usually photographed for the purpose of detecting defects in the gun.

AMERICAN "BLIMPS" A SUCCESS.

NAVY officials, enthusiastic over the successful builders' trial of the first 16 non-rigid dirigible balloons ordered three months ago, say that the dirigible program is now assured of completion much sooner than had been expected. The contract called for delivery within four months, but the builders are turning the first ship over for active duty within less than 90 days of the date of the contract, and henceforth one or more will be delivered every week.

The trip of 16 hours from Chicago to Akron covered more than 400 miles. It was made under direction of the builders, the Goodyear Tire & Rubber Co., Akron, Ohio, and did not constitute an official test, but was so successful that navy offi-



BLIMP MANUFACTURED BY THE CONNECTICUT AIRCRAFT CO.

cials are confident a valuable type similar to the "Blimp" of the British navy had been produced which will make the required forty miles an hour at official trials.

The ship was designed by Naval Constructor J. C. Hunsaker, of the Bureau of Construction and Repair, and the unofficial test is regarded as having proved conclusively that the weight problem has been solved.

Of the 16 dirigibles contracted for by the government the Goodyear company is constructing nine and the others are being built by The B. F. Goodrich Co., Akron, Ohio, the Curtiss Aircraft Co., Hammondsport, New York, and the Connecticut Aircraft Co., New Haven, Connecticut.

The American "Blimps" will form a part of the coast patrol as lookouts to watch for the approach of enemy vessels. Crews are being trained at the naval aviation station at Pensacola, where the first dirigible, DN-1, an older type craft, suitable only for training purposes, is in daily operation.

The new airships have greater speed and greater weight-carrying capacity, and are expected to be an effective element of the coast defenses, particularly in the detection of submarines, in which service the British "Blimps" have repeatedly proven their value.

The Navy Department expects that the entire 16 will be in service by the middle of August, and that they will be distributed to operate in pairs along the Atlantic coast, working from special bases ashore and supplementing the operations of submarine chasers, reserve destroyers and other naval craft now on guard duty.

DAMP PROOF UNIFORMS.

Because of the dampness of the trenches, single texture fabric is now advocated for soldiers' uniforms. The suggestion is that the garments be made in such manner as to render them moisture proof, yet not air proof.

3,500 AIRPLANES FOR 1917.

AIRCRAFT production and the training of aviators is to be one of America's chief early contributions to the war. Announcement has been made that the Aircraft Production Board, under the direction of Howard E. Coffin, is to construct 3,500 war airplanes and train 6,000 aviators this year, and that the output will be at least doubled next year.

British and French authorities regard American aero service as the greatest assistance that can be rendered quickly, and the recent success at Messines, indicating indisputably the decisive part played by airplanes in modern warfare, seems to forecast the passage, in part, at least, of the Shepard-Hulburt bill creating a separate aviation department of the government and calling for \$500,000,000 to \$1,000,000,000 for a great air fleet.

The unjustifiable German air raids over London recently are regarded as a trap to draw British machines from the western front and to break Field Marshal Haig's present aerial supremacy.

The Aircraft Production Board is working in conjunction with the Aero Club of America in advocating that the United States must strike Germany through the air. Military authorities agree that, in addition to airplane reconnaissance and mapping by photography, air raids on a large scale will blind German batteries, destroy supplies and prevent German airplane operations over the Allies' lines. The task of the Aero Club, therefore, according to present plans, is to recruit and train 10,000 or more aviators to fly the tens of thousands of airplanes which the Aircraft Production Board contemplates constructing. These airplanes will be of several different types for training, bomb dropping, artillery spotting, sighting and submarine destroying.

This first instalment alone represents a considerable quantity of rubber manufactures. Rubberized fabrics of flax or linen and sometimes of cotton or ramie are used for covering the sustaining surfaces; the supporting wheels are pneumatic tired; springs or shock absorbers of molded rubber, sometimes in the form of rings, protect machine and aviator from too violent shocks when leaving and returning to earth; the delicate mechanism of navigating instruments is protected from excessive vibration and sudden shock by soft, elastic rubber attachments which hold them in place; and the upholstering of the aviator's seat is often of rubberized fabric inflated with

men are not agreed as to design and requirements. The American Rubber Co., Boston, Massachusetts, which not only manufactures balloon fabrics, but also an extensive line of coated



AVIATOR'S UNIFORM, DESIGNED BY THE AMERICAN RUBBER CO.

fabrics and rubberized clothing, has been working out the airman's problem. The requirements for flying over water are different from those over land. The outfit designed for the former comprises three uniforms. The first is a two-piece suit of drab wool khaki, much like the regulation army uniform, but double-breasted to give greater warmth. The second is a one-piece garment—really an overgarment covering the other suit, and lacing below the knee. This is made of double texture fabric, making a windproof and waterproof covering. Over this may be worn the safety jacket, the outside of which is also of double texture fabric. There is an inner collar with draw string, and outside collar of corduroy, and the sleeves are provided with wind cuffs. This is fastened to an inner jacket, lined or filled with kapok, which, because of its buoyancy, will act as a life preserver if the airman falls into the water. The illustration shows an aviator thus appared. Although the outfit is bulky, it gives the wearer full use of his arms and legs without restraint.



THE NEW CURTISS TRIPLANE.

LATEST DEVELOPMENT OF THE ARMY AIRPLANE.

air. Repairs and replacements, particularly tires, must be provided for as well as the initial equipment. The outfitting of 6,000 aviators is in itself no small matter, including elastic safety belts, hard rubber helmets, rubberized suits and gloves as a protection from cold and rain.

There is at present no standard uniform for aviators. Air-

A new suit for overland flying is made of single texture cravenette. It is of the one-piece model, with a lined underwaist. The suit has slashed pockets at breast and sides, and is belted. A novel feature is the fastening, which does away with all buttons, buckles or lacings. It is a patented fastening, a lattice of little wires on either edge of the opening. When a sliding key is pulled up, the lattice interlocks; when pulled down it is unlocked. The operation is practically instantaneous, a point of value when time is precious.

These suits are the result of careful study of all the peculiar requirements, and have received the approval of a large number of veteran airmen.

CABLES TO THE FORCES IN FRANCE.

The Western Union Telegraph Co. has made special arrangements under which week-end letter cablegrams of a social character may be sent to soldiers, sailors and nurses of the American expeditionary forces in England and France, such cablegrams to be charged on a word basis within the minimum charges applicable in the case of ordinary week-end cablegrams. These messages will bear the indication "EFM," which will be counted and charged for, and must be addressed "Amexforce, London," and in addition must contain the addressee's name, the name of the regiment, ship or number of the unit with which the addressee is serving, all messages to be accepted at sender's risk, subject to censorship and delay. Similar arrangements have been made for the acceptance of messages from members of the expeditionary forces in England and France to their friends and relatives in the United States. These week-end letter cablegrams to and from France will be handled by post between London and

France. The rate will be five cents per word from New York City, including the indication "EFM," name, address and signature.

THE RUBBER TRADE ROLL OF HONOR.

ONE of the greatest privileges that can come to a nation, an industry, a family, is the despatch of its young manhood to battle for its honor, perhaps for its existence. In this war, which was not of our seeking, but from which there was no righteous escape, many are offering that personal service that means privation and peril certainly, and possibly wounds and death. It is an honorable service in a cause that history will write down as glorious.

In the columns below will appear from time to time the names of the men who constitute the Roll of Honor of the American Rubber Trade. We name them with pride, these willing, stalwart members of the great and potent Army of Freedom:

RUBBER TRADE ENLISTMENTS.

NAME.	EMPLOYER.	BRANCH OF SERVICE.
Richard Bee	Ajax Rubber Co., Inc.	Naval Coast Reserve
Clarence C. Davis	Ajax Rubber Co., Inc.	U. S. Army, Governors Island
Robert B. Kerr, Jr.	Ajax Rubber Co., Inc.	Plattsburg, N. Y.
E. N. Sponza	Ajax Rubber Co., Inc.	U. S. Army
John A. Thayer, Jr.	Ajax Rubber Co., Inc.	Plattsburg, N. Y.
John W. Dowling	American Hard Rubber Co.	U. S. Army, Cavalry
Thomas A. Fox	American Hard Rubber Co.	Troop G, 2nd U. S. Cavalry
Nicholas Martin	American Hard Rubber Co.	Depot Battalion, 69th N. Y. Infantry
John Miller	American Hard Rubber Co.	Base Hospital No. 6, N. Y. Post-Graduate Hospital
Thomas E. Moore	American Hard Rubber Co.	Company "M," 23rd N. Y. Infantry
James Olsen	American Hard Rubber Co.	U. S. Navy
Valentine Schumacher	American Hard Rubber Co.	U. S. Naval Reserve, Class No. 4, District No. 3
James E. Tierney	American Hard Rubber Co.	Company "M," 23rd N. Y. Infantry
Wm. E. Tierney	American Hard Rubber Co.	12th Co. N. Y. C. A., 13th C. D. C.
William Werner	American Hard Rubber Co.	1st Battalion, N. Y. Naval Militia
F. H. Appleton, Jr.	F. H. Appleton & Son, Inc.	Captain, Sixty-Seventh Co., M. S. G.
Frank F. Nixon, Jr.	Arnold & Zeiss.	Cavalry, Regular Army
W. Russell Smith	Arnold & Zeiss.	U. S. Coast Artillery
J. A. Talbot	Bloomington Rubber Co.	Second Battery, Field Artillery
Chesley Whitten	Cambridge Rubber Co.	Reserve Officers Corps (Plattsburg, N. Y.)
Frederick H. Cone	Frederick H. Cone	Reserve Officers Corps (Madison Camp)
Leonard Malone	Frederick H. Cone	Reserve Corps, U. S. Army
Eben E. Sawyer	Continental Rubber Works	Medical Reserve Corps, New York Hospital, Base No. 9
Lewis L. Enow	Duane Rubber Co.	Navy, 1st class yeoman
R. E. Ard	The Federal Rubber Co.	Navy, 2nd yeoman
Chas. McGinnis	The Federal Rubber Co.	Troop K, 14th Regiment, U. S. Cavalry
J. M. Geary	Firestone Tire & Rubber Co.	U. S. Army
R. Ketchum	Firestone Tire & Rubber Co.	Quartermaster's Department, U. S. Army
W. W. Stake	Firestone Tire & Rubber Co.	Commissioned Second Lieutenant, Infantry, U. S. Reserve
Ralph Clark	Frazar & Co.	First Reserve Engineers, New York
Howard H. Williams	Frazar & Co.	Naval Coast Defense Reserve
J. E. MacDonald, Jr.	Goodall Rubber Co., Inc.	Reserve Officers Corps (Plattsburg, N. Y.)
D. L. Taylor	Goodall Rubber Co., Inc.	Reserve Officers Corps (Fort Meyer, Va.)
F. B. Williamson, Jr.	Goodall Rubber Co., Inc.	2nd Marine Co., 3rd Battalion, Marine Barracks, N. Y.
I. A. Dailey	The B. F. Goodrich Co.	Mosquito Fleet, Marblehead Training Station, Marblehead, Mass.
Prescott M. Dean	The B. F. Goodrich Co.	Navy Service
William Henderson	The B. F. Goodrich Co.	2nd Marine Co., 3rd Battalion, Marine Barracks, N. Y.
Edward W. Hoercher	The B. F. Goodrich Co.	Officers Reserve Corps, Co. 8, Madison Barracks
A. C. King	The B. F. Goodrich Co.	3rd District, Coast Defense Reserve
Norman D. Riker	The B. F. Goodrich Co.	Medical Reserve Corps, U. S. Army
Albert Beck	The B. F. Goodrich Co.	U. S. Naval Militia
Frederick B. Brewer	The B. F. Goodrich Co.	Medical Reserve Corps, U. S. Army
John Eichman	The B. F. Goodrich Co.	Medical Reserve Corps, U. S. Army
Chester C. Felton	The B. F. Goodrich Co.	Medical Reserve Corps, U. S. Army
Douglas Stanley	The B. F. Goodrich Co.	American Field Ambulance Corps
Warren E. Taylor	The B. F. Goodrich Co.	American Field Ambulance Corps
Lloyd Whiting	The B. F. Goodrich Co.	Naval Reserve Force, U. S. N.
Frank L. Byrne	Gove & French, Inc.	Ordnance Department, U. S. Government
S. Leslie Smith	W. R. Grace & Co.	National Coast Defense Reserve
J. W. Bush	W. Hammesfahr & Co.	
J. A. Faulkner	Henderson & Korn	
Allie Meyer	Henderson & Korn	
A. W. Barry	Kelly-Springfield Tire Co.	Motor Truck Division
Geo. R. Weber	Kelly-Springfield Tire Co.	U. S. Navy
A. Baker	Knight Tire & Rubber Co.	Ambulance Corps
John Lefel	Knight Tire & Rubber Co.	Ohio National Guard
W. K. Negley	Knight Tire & Rubber Co.	Ambulance Corps
J. P. Sherer	Knight Tire & Rubber Co.	Ambulance Corps
A. H. Snyder	Knight Tire & Rubber Co.	Ambulance Corps
Dan Williams	Knight Tire & Rubber Co.	Engineers Division
George M. Jenkins	McLean Tire & Rubber Co.	Engineers Division
E. L. Pittenger	McLean Tire & Rubber Co.	Infantry, Regular Army
Harry Wolfe	McLean Tire & Rubber Co.	R. O. J. C., Madison Barracks
Alan D. Oppenheimer	Oppenheimer & Co.	Regular Army
John Lenz	Parker, Stearns & Co.	U. S. Army
Geo. Trubig	Parker, Stearns & Co.	Regular Army
Edw. Williams	Parker, Stearns & Co.	U. S. Army Sanitary Corps, Ambulance No. 33
Frank Tracey	Pell & Dumont	Co. K, 2nd Regiment, N. G. N. J.
Arthur Adams	Rubber Insulated Metals Corp.	Co. K, 2nd Regiment, N. G. N. J.
Charles Bowman	Rubber Insulated Metals Corp.	Co. K, 2nd Regiment, N. G. N. J.
John Perrine	Rubber Insulated Metals Corp.	Naval Militia
Robert Cox	The Simplex Rubber Co. of America, Inc.	1st Engineers, U. S. A.
Frank Hutchinson	Smith & Schipper	Coast Defense
Arthur Miller	Smith & Schipper	American Volunteer Ambulance
Reginald D. Smith	Smith & Schipper	1st Lieutenant, Regular Army
Harold R. Teller	Smith & Schipper	1st U. S. Reserve Engineers
John F. Kenyon	J. Spencer Turner Co.	Coast Guard
Vincent A. Kenyon	J. Spencer Turner Co.	

EMPLOYER

CLASS B GASOLINE TRUCK TIRES.

On two-wheel drive trucks the tires shall be 36 by 5-inch dual tires, or 36 by 10-inch single tires on rear wheels, and 36 by 5-inch single tires on front wheels, both front and rear tires demountable. The 36 by 10-inch single tires are preferred. These tires must be interchangeable with 36 by 5-inch dual equipment.

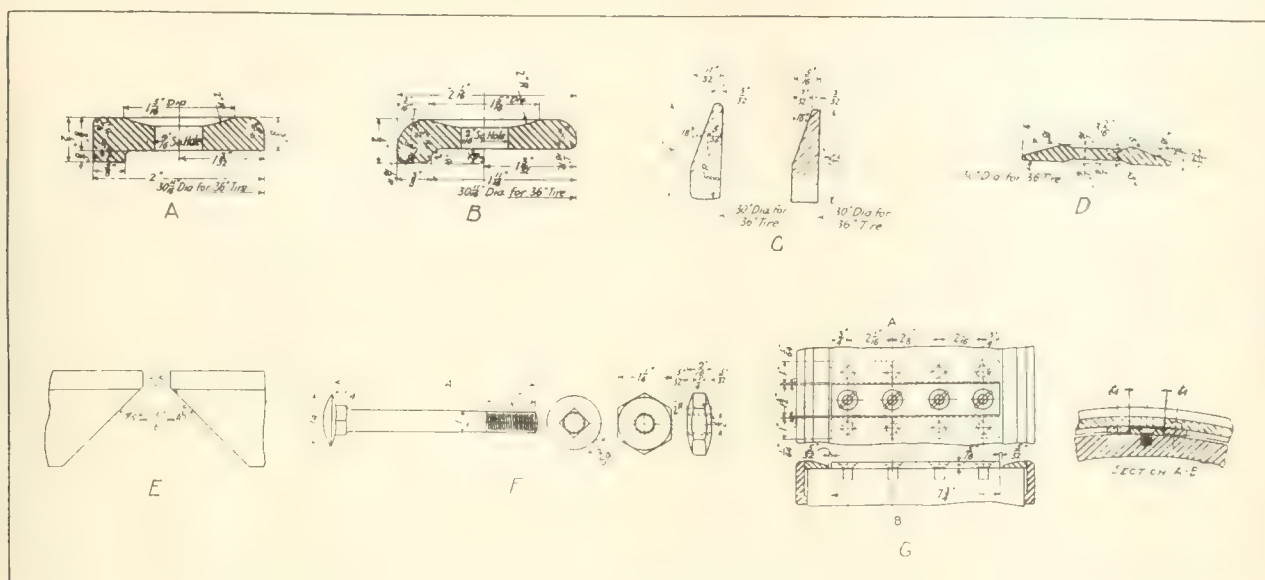
S. A. E. TIRE AND RIM DIVISION REPORT.

THE following important report of the tire and rim division of the Society of Automotive Engineers has been approved by the Standards Committee, and will undoubtedly be adopted by the society. The report recommends that the standard specifications for demountable tire and rim equipment and fastenings for the 1½- and 3-ton military trucks, designated as Class A and Class B, respectively, shall be as follows:

1. Felloe bands and nominal tire diameters are to conform to S. A. E. standard specifications.

2. A type of tire channel shall be used that will permit of one size of wedge ring being used for both single and dual equipment, regardless of sectional size; also one standard section of center wedge ring for use between dual tires of all sectional sizes.

3. Side flanges shall be used, having the S. A. E. standard bolt circles. Flanges shall be provided with bolt-holes in ac-



S. A. E. DEMOUNTABLE RIM FASTENINGS FOR CLASS A AND B MILITARY TRUCKS.

cordance with S. A. E. standards, the 36-inch with 12 holes and the 40-inch with 15 holes. These flanges shall be provided with bolt holes $9/16$ inch square, with spherical counterboring that will permit them to be used for either inside or outside flanges. See Figs. A and B.

4. Side wedge rings shall be as per Fig. C, or equivalent.

5. Center wedge rings shall be as per Fig. D, or equivalent.

6. Ends of all side wedge rings shall be cut as per Fig. E, or equivalent.

7. All nuts shall be as per Fig. F, or equivalent, preferably case-hardened.

8. Referring to Fig. F, bolt heads shall be made to conform to the square hole and the spherical counterboring in the side flanges, Fig. A. The lengths shall be according to the following table:

Tire Section.	Single.	Dual.
4	4 3/8	9 1/2
5	5 1/8	11 1/2
6	6 5/8	13 1/2
7	7 5/8	15 1/2

All bolts $1/2$ by 13 U. S. S. threaded $1/4$ -inch minimum.

9. Contours of the underside of tire channels shall be equal to or interchangeable with the contours shown in the lower illustration.

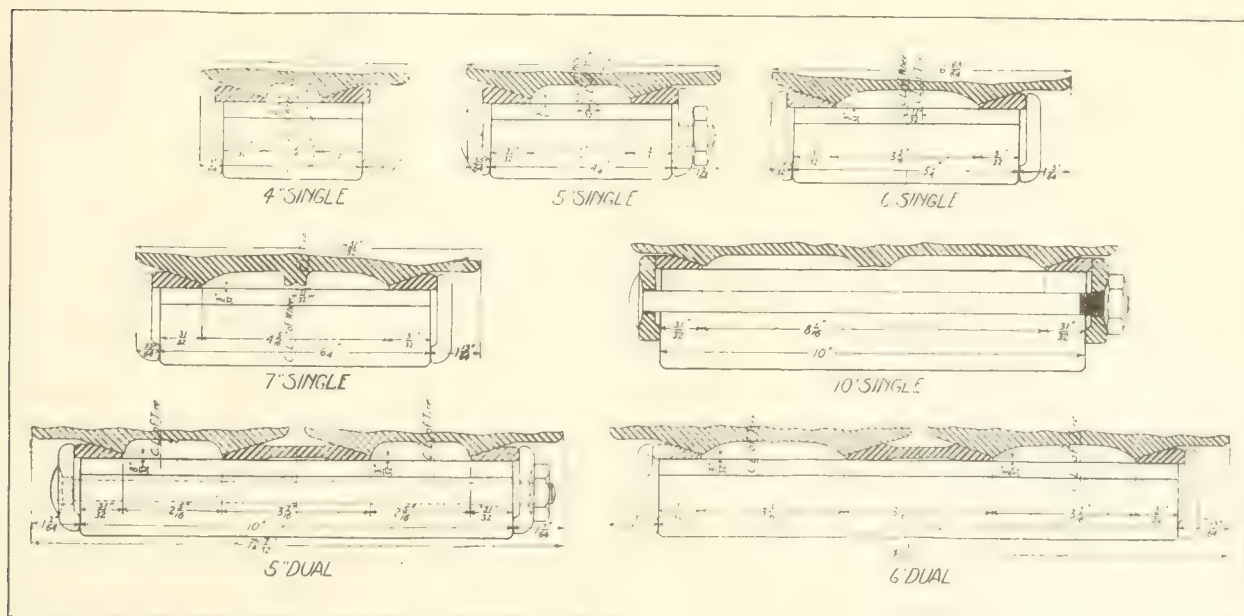
10. It is understood that the present tire sizes in the military truck specifications are:

36 by 4 inch, single	36 by 7 inch, single
36 by 5 inch, single	36 by 5 inch, dual
36 by 6 inch, single	36 by 6 inch, dual

CARRYING CAPACITIES AND INFLATION PRESSURES OF PNEUMATIC TIRES.

The division recommends that the inflation pressures given in the following table be standardized, the loads per tire and the pounds per square inch inflation being maximum values.

Size of Tire, Inches.	Maximum Load, Pound per Tire.	Maximum Inflation Pressure, Pound per Square Inch.
3	375	45
3 1/2	570	55
4	815	65
4 1/2	1,100	75
5	1,300	85
5 1/2	1,700	85
6	2,000	90



S. A. E. DEMOUNTABLE RIMS FOR CLASS A AND B MILITARY TRUCKS.

What the Rubber Chemists Are Doing.

CATALYTIC ACCELERATION OF VULCANIZATION.

IN the "Journal of the Society of Chemical Industry," April 30, 1917, S. J. Peachey discusses organic accelerations with special reference to para-nitrosodimethylaniline discovered and patented by him as an accelerator of the vulcanizing process. [English patent No. 4,263 (1914).]

Extracts from the original paper and discussion follow:

Generally speaking, the addition of 0.3 to 0.5 per cent of nitroso-base to any mixing of good quality is sufficient to reduce the time of vulcanization from one-quarter to one-third of that normally required. The nitroso-base is now being employed successfully under the trade name of "Accelerene."

p-Nitrosodimethylaniline is a green crystalline powder of melting point 85 degrees C. It is usually marketed in a moist condition (about 30 per cent of water), this adding considerably to its stability and rendering it safer to store in bulk. Before use it may conveniently be dried by exposure to warm air, or preferably in a vacuum dryer. It should be incorporated with the rubber towards the end of the mixing operation, as there is otherwise some danger of a partial vulcanization taking place on the rolls.

The time required for curing the mixing may be roughly calculated on the assumption that the use of 0.5 per cent (on the weight of the mixing) of nitroso-base reduces the time of cure to one third of the normal. In the case of red mixings containing antimony sulphide as the vulcanizing agent without added sulphur, the accelerator fails to develop its full effect. In such cases it becomes necessary to introduce a certain quantity of sulphur, mainly as pigment. The presence of litharge in any quantity tends to diminish the effectiveness of the organic accelerator. The presence of a small quantity of magnesia augments very considerably the accelerating power of the nitroso-base, and by using the two substances in suitable proportions it is possible to prepare high-class mixings which will vulcanize perfectly in about one-eighth of the normal time, or about ten minutes.

It is to be noted that the maximum accelerating power of *p*-nitrosodimethylaniline is only fully manifested when new rubber is used; with reclaimed rubber or rubber waste the results obtained are not very satisfactory.

One of the most valuable applications of the new accelerator is in the manufacture of vulcanite. A pure vulcanite mixing of 100 parts rubber and 40 parts sulphur normally requires about six hours to cure. Such a mixing, by the addition of 0.6 to 0.75 per cent of nitroso-base, can be perfectly cured in two hours.

The nitroso-base effectively obviates "blooming" or "sulphuring-up." In such case there is little or no reduction in the time of vulcanization owing to the diminished proportion of sulphur present, the power of the catalyst being expended in bringing about practically complete combination between the molecules of the rubber and the sulphur.

It is fairly generally accepted that vulcanization by Good-year's process involves the following changes:

1. Depolymerization by heat of the complex rubber molecule.
 2. Adsorption of sulphur by the rubber colloid.
 3. Combination of the depolymerized rubber with sulphur.
 4. Repolymerization to complex molecules as a result of (3).
- The final product—the vulcanized rubber—is regarded as being a solid (or semi-solid) solution of the compound of rubber and sulphur in unchanged rubber.

The newly discovered organic accelerators differ from the so-called sulphur carriers in that an exceedingly small quantity of material is effective in bringing about a very powerful acceleration, evidently of a catalytic nature. The main characteristics of catalytic actions are that the catalyst is usually present

in relatively small concentration and that it does not start a reaction, but only accelerates a change which can proceed by itself. Taking *p*-nitrosodimethylaniline as an example, its presence in one two-hundredth of the mass of the reacting substances is sufficient to treble the speed of the reaction. The internal heat theory cannot possibly apply here. The accelerating effect of these nitroso-bases is in some manner bound up with the presence of a nitroso group directly linked up with the nucleus.

It is important to note that the catalytic action of *p*-nitrosodimethylaniline appears to differ entirely in mechanism from that of piperidine and of the other bases covered by Bayer's patents. The latter appear to act by virtue of their powerful basic character. *p*-Nitrosodimethylaniline is a very feeble base with a dissociation constant far below that quoted in Bayer's patent. The accelerators discovered by the author constitute a new class and appear to owe their accelerating power to the presence of the nitroso group.

The author in his experiments found that certain organic compounds possess the property of retarding vulcanization, apparently acting as anti-catalysts. Phenylhydrazine is an example. Other substances behave similarly, notably glucose and methylene blue.

In reply to discussion of his paper the author further explained his researches on accelerators in part as follows:

Not much progress has been made as regards the possibility of detecting the nitroso-base in the vulcanized rubber, but the acetone extract of such a rubber is always so lightly colored that in the absence of anything else which would yield a dark color, that alone would suggest the use of the accelerator.

If rubber were heated with nitroso-base a tarry mass was formed; there was no evidence of vulcanization.

With regard to the prejudicial effect of *p*-nitrosodimethylaniline upon the health of workers using it, it was largely a question of the impurities originally present in the nitroso-base and the pure material is not so objectionable as the crude.

Regarding the stability of vulcanized rubber, samples have been kept for two years or more. Except in the case of a few which were not more than 0.1 millimeter thick there has been no deterioration.

The strength tests carried out with material vulcanized in conjunction with the accelerator gave better results than those obtained with material normally vulcanized as nearly as possible in the correct time to give the same cure. There appeared to be a uniform slight increase in strength as the result of using the accelerator, but the experiments must be confirmed on a very large number of samples.

PLANTATION FACTORY PRACTICE IN RELATION TO VULCANIZATION TESTS.

Bulletin No. 27 of the Ceylon Department of Agriculture, entitled "Vulcanization Tests," details the results of investigations at the Imperial Institute on samples of plantation *Hevea* rubber prepared by L. E. Campbell, B.Sc., the rubber research chemist.

For comparison the experiments were conducted in duplicate with latex from 7-year trees and also from trees 16 to 20 years old. The 88 specimens dealt with were prepared with the object of studying the effect of (1), the smoking of sheet rubber; (2), the addition of alkaline creosote solution to the latex before coagulation; (3), the Brazilian, Wickham and Byrne processes; (4), the rolling up of plain sheet and smoked sheet rubber, both dry and wet, with and without tension; (5), the conversion of crêpe rubber into wet and dry block, and (6), the separation of the rubber from the latex in successive portions.

The conclusions were summarized as follows:

(1) Spontaneous coagulation of the latex usually yields rubber of good quality, but the method is scarcely suitable for practical use.

(2) Scrap rubber from the trees has invariably given a low tensile strength after vulcanization.

(3) Acetic acid is quite satisfactory as a coagulant, and, so far as the vulcanizing and mechanical properties of the rubber are concerned, there would appear to be no advantage in using any other acid in place of it.

(4) Plain unsmoked sheet rubber is usually of excellent quality, the unvulcanized product having, as a rule, a tensile strength of 2,300 to 2,400 pounds per square inch. The rubber also cures fairly rapidly, the average time under the conditions of the present series of tests being about 70 minutes.

(5) Crêpe rubber invariably takes a much longer time to cure (105 to 130 minutes) than the corresponding plain sheet from the same latex, and this effect is brought about even if the freshly coagulated rubber is only passed through the rough rollers four times. The mechanical properties of crêpe rubber after vulcanization are very frequently inferior to those of the corresponding plain sheet.

(6) The "over-working" of the freshly coagulated rubber in the preparation of crêpe (up to 70 times through the rough rollers) has very little effect on the mechanical properties of the vulcanized rubber, and only slightly increases the time of cure, compared with that of crêpe made by passing through the rough rollers only 5 or 7 times.

(7) Thick crêpe rubber, made by rolling together several pieces of thin crêpe, does not differ from the latter in time of cure, and the differences in tensile strength are not very marked or constant. Thick crêpe, made by rolling out the coagulum to the required thickness, usually cures in a shorter time than the corresponding thin crêpe.

(8) Different methods of drying (air-drying at the ordinary temperature, drying in hot air, and in vacuo) have very little effect on the time of cure or the tensile strength of the rubber.

(9) The smoking of sheet rubber increases the time of cure very considerably, and in some cases appears to affect adversely the mechanical properties of the vulcanized product.

(15) It is not possible at present to suggest a method of obtaining rubber with a uniform rate of cure, as samples made under exactly similar conditions at different times vary considerably in this respect. The bulking of the product obtained over a considerable period would appear to be the only practicable way of approximating to this result, until further research has thrown more light on the fundamental condition in rubber which influences rate of cure.

COMMITTEE D-11 ON RUBBER PRODUCTS.

At the meeting of the American Society for Testing Materials held at Atlantic City, New Jersey, June 26-29, 1917, the various sub-committees of Committee D-11 on rubber products reported progress only on their assignments, except sub-committee 1 on air hose, which offered a tentative specification on air line hose for pneumatic tools. The rubber qualities recommended in this specification include 15-pound friction separation at a rate not exceeding one inch per minute.

Test pieces shall be cut longitudinally from the hose.

TUBE AND COVER. When stretched from two to nine inches the stress upon the tube shall be at least 900 pounds per square inch, and that upon the cover 800 pounds per square inch.

The set, or permanent elongation, shall not exceed 25 per cent.

The tensile strength shall not be less than 1,500 pounds per square inch for the tube, and 1,300 pounds per square inch for the cover.

Both tube and cover shall have an elongation at the breaking point of at least 2 to 10½ inches.

RUBBER FOR NEW YORK FIRE DEPARTMENT HOSE.

The quality and tests of rubber, required by the specifications of the City of New York for fire and street-cleaning hose, are shown in the following tabulation:

Contents and Characteristics.	A		B		C		D		E	
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
Vulcanized rubber gum by volume (per cent).....	75	...	75	...	70	...	85	...	55	...
Organic acetone extract (per cent by weight of vulcanized rubber gum present).....	...	8	...	8	...	5	...	15	...	15
Total sulphur in all forms (per cent by weight of vulcanized rubber gum present).....	...	4	...	4	...	3	...	...	...	...
Free sulphur (per cent by weight of vulcanized rubber gum present).....	...	...	...	...	...	3	...	5	...	4
Dry inorganic mineral fillers (not to contain carbon except as carbonate).....	Balance	Balance	Balance	Balance	Balance	Balance	Balance	Balance	Balance	Balance
Tensile strength (pounds per square inch).....	1,400	...	1,400	...	1,800	...	500	...	1,000	...
Reduction of tensile strength after being subjected to dry heat at 220 degrees F. for two hours (per cent).....	...	20	...	20	...	0	...	20	...	20
Tensile strength (pounds per linear inch in any seam).....	...	...	...	...	...	...	...	...	...	...
Elongation at breaking point (per cent).....	300	...	300	...	500	...	...	...	200	350
Reduction in elongation at breaking point after being subjected to dry heat at 220 degrees F. for two hours (per cent)...	...	20	...	(c)	...	15 (d)	...	25	...	30
Set (per cent of elongation at breaking point).....	...	10 (e)	...	6	...	...	...	10	...	8

(10) The addition of an alkaline solution of creosote to the latex before coagulation does not affect in any way the properties of the dry sheet rubber.

(11) The Wickham block and the Byrne blocked worm and thin crêpe did not show to any advantage, so far as the mechanical properties of the vulcanized product are concerned.

(12) Pressing the dry rubber into block, or rolling it up with or without tension, has very little effect on the time of cure or on the mechanical properties.

(13) There is no marked difference in time of cure or physical properties between the rubbers obtained by coagulating latex in two or three fractions.

(14) Rubber which is allowed to remain in a wet condition after coagulation (creosote having been added as a preservative) appears to be invariably quick curing, and to give very good mechanical results after vulcanization. Such rubber loses some protein on washing. In these cases the rapidity of cure appears to be related in some way to the moist condition of the rubber, and in some specimens the time of cure varies with the percentage of protein, the sample containing the lowest amount of protein curing in the shortest time. It is, however, impossible at present to connect these facts definitely, as a sample of rubber prepared by evaporating the latex in vacuo, which contained a very large amount of protein, also had a very short time of cure. Further work on this important point will be required, but if in the meantime a quick curing rubber with good mechanical properties is desired by manufacturers, it would appear that it could be obtained by pressing wet creosoted sheet into blocks of suitable size.

Vulcanized rubber gum by volume equals specific gravity times per cent by weight of rubber.

(a) Air hose tube only.

(b) Cotton rubber lined fire hose tube and rubber fire hose tube only.

(c) Rough bore suction, 30 per cent; general water hose, 20 per cent.

(d) Street cleaning hose, 20 per cent.

(e) Spray hose, six per cent.

The stocks indicated above are specified as follows:

A. Air hose tube and cover, and spray hose tube and cover.

B. General water hose (one and one-quarter inch and up) tube and cover, and rough bore suction cover.

C. Cotton rubber-lined fire hose tube; rubber fire hose tube and cover, and street cleaning hose tube and cover.

D. General water hose (one inch and under) tube and cover.

E. Coupling washers for fire hose.

Specifications for gasoline and steam hose do not indicate percentages of rubber or chemical tests. The requirements of rubber quality are limited to physical tests as follows:

GASOLINE HOSE. TUBE AND COVER. Tensile strength per square inch, 1,000 pounds, minimum. Elongation at breaking point 300 per cent, minimum. Reduction in tensile strength per square inch after submersion in 60-degree Baumé naphtha for a period of 48 hours and dried in air 24 hours, 20 per cent maximum. Reduction in elongation at breaking point after submersion, 30 per cent maximum. Non-volatile matter extractable in 60-degrees Baumé naphtha, one and one-half per cent maximum. Set (per cent of elongation at breaking point) six per cent maximum.

STEAM HOSE. TUBE AND COVER. Tensile strength per square inch before heating, 800 pounds minimum. Tensile strength per square inch after being subjected in the hose to 60 pounds steam

pressure per square inch for five days during eight hours each day, 600 pounds minimum. Elongation at breaking point before heating, 300 per cent. Elongation at breaking point after heating as above, 225 per cent minimum and 25 per cent maximum. Set (per cent of elongation at breaking point) 6 per cent maximum.

FRICTION TESTS.

Test.	Weight of Sample.	Set, per Min.	Length, Set.	Remarks.
Pounds.	Inches.	Inches.	Inches.	
12				After 48 hours in jacket.
10	1	1		Braided plies.
20	1	1		Duck plies.
12	1	1		After 48 hours in jacket.
15	1	1		Duck plies.
10	1	1		Braided plies.
15	1	1		Duck plies.
20				Tube and duck and duck plies.
Water (fire)....	15			Cover and duck.
Water (general)...	10			Braided plies.
Water (street)...	10	1	1	
Water (street)...	20	1	2	Tube and duck.
Water (street)...	15	1	2	Cover and duck.

CHEMICAL PATENTS.

THE UNITED STATES

MANUFACTURE OF DIOLEFINS ISOPRENE AND CAOUTCHOUC-LIKE SUBSTANCES. Improvement in the art of producing a diolefin and a caoutchouc-like body, consisting in adding fuming sulphuric acid to a mixture of an aliphatic ketone and an alcohol, both capable of yielding isoprene and caoutchouc and separating the products formed. [Hermann Stern, Munich, Bavaria, Germany. United States patent No. 1,218,332.]

ARTIFICIAL GUM. The process of making a condensation product suitable for reacting with formaldehyde to produce a gum, which consists in heating an impure phenol containing a cresol with an impure ketone in the presence of a condensing agent. [Wallace A. Beatty, New York City. United States patent No. 1,225,750.]

GERMAN PROCESS FOR SYNTHETIC RUBBER. This process has for its object the manufacture of isoprene, caoutchouc and caoutchouc-like substances by the reaction of fuming sulphuric acid on a ketone, simple or compound, or a mixture of ketones and an aliphatic oxide.

As an example of the process the following is noted:

To six kilograms of acetone contained in a vessel with a cooler, there is added gradually in small portions nine kilograms of fuming sulphuric acid containing 18 to 20 per cent of anhydride, in such manner that the temperature does not rise above 80 or 90 degrees C. In about one hour and a quarter all the sulphuric acid will have been added. The mixture, still hot, is placed in another vessel provided with a gas inlet and outlet pipe. About three kilograms of ethylene gas are passed through the mixture, which is heated to 100 to 110 degrees C. In two or three hours the reaction is complete and solid caoutchouc-like substances and liquid products are found. The liquids are distilled off and collected in a container cooled by a cooling mixture. The non-condensable gases escape by way of a pipe on this container. After neutralization of the acid mixture about five kilograms of raw caoutchouc and about one and one-half kilograms of isoprene and other volatile products are obtained.

Various experiments have shown that homologues and analogues, as well as mixtures of caoutchouc, are obtained when a simple ketone or a mixed ketone is heated alone or with fuming sulphuric acid. [Hermann Stern, Munich, Germany. United States patent No. 1,218,332.]

SOLID VEHICLE TIRE. A mixture of rubber, 34 parts; lithopone, 50 parts; sulphur, 6 parts; litharge, 2 parts, and oxide of iron, 2 parts. [A. Nixon. United States patent No. 1,221,083.]

THE UNITED KINGDOM

INDIA RUBBER SUBSTITUTES. Made by treating, under the influence of light, mixtures of collagenous substances and hydroscopic substances, with or without fillers, with chromates, bichromates, or other oxidizing agents, the influence of light and the rate of oxidation being reduced by the addition of dyes, preferably in the presence of mineral oils, fats, etc. The mass is protected from the action of air and light until the final heating, which is continued at 80 degrees C., until all water is removed, air being passed through the mass during the process. Either aniline or mineral dyes are employed. The following is an example of proportions: Gelatine, 50 parts; glycerin, 65 parts; saccharose, 50 parts; kieselguhr, 20 parts; colcothar (red), 12 parts; zinc white and paraffin oil, each 5 parts; borax and potassium bichromate, each 1 part, and 5 drops of a 10 per cent solution of phenol. Rubber and sulphur may be added and the mixture vulcanized. [W. E. Reeser and A. Van Wille, Amsterdam, Holland. British patent No. 104874 (1917).]

INDIA RUBBER COMPOSITION. A rubber and sulphur mixture containing horse hair or bristles (three to four millimeters long) intended for use in the manufacture of tires, soles and heels, belting and packing rings. [C. Pacchetti, 28 Via Legnano, Milan, Italy. British patent No. 105,026 (1917).]

BALLOON FABRIC COMPOSITIONS. An impregnating and coating composition consists of pyroxylin dissolved in ether and alcohol, celluloid, Canada balsam, castor oil, and rubber. Aniline dyes soluble in spirit or oil, preferably those which tend to destroy the actinic powers of light, such as yellow or red dyes, and metallic pigments, such as aluminum, may be added. The composition may be used as a dope for balloon fabrics and many similar surfaces intended to be rendered water- or gas-proof. [L. C. Wooldridge, 231 Broadway, Cricklewood, and A. Fox, 19 Ramsey Road, West Hendon—both in London. British patent No. 105,137 (1917).]

CANADA.

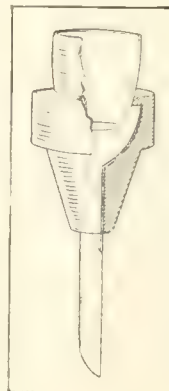
TIRE PUNCTURE COMPOSITION. A preparation for sealing automobile tire punctures, consisting of water, two quarts; granulated cork, four ounces; powdered cork, two ounces; French chalk, one pound; white lead, eight ounces, and gum arabic, two ounces. [Ernest Campbell and Thomas F. Cashman, assignee of half interest—both of Calgary, Alberta, Canada. Canadian patent No. 175,134.]

RECLAIMING RUBBER. Method of reclaiming rubber from rubber waste or of improving natural crude rubber and reclaimed rubber generally, which comprises incorporating with the rubber a single ring phenol or its homologues under conditions which will produce the modifying results indicated. [Harold T. G. von der Linde, Plainfield, New Jersey. Canadian patent No. 175,240.]

RUBBER SUBSTITUTE. A composition made by heating together 360 parts by weight of gelatine, 75 parts by weight of glycerin and 35 parts by weight of chromic acid. [Peter B. Mellon, Ottawa, Ontario, assignee of Wolff Sudermann, New York City. Canadian patent No. 175,283.]

LABORATORY APPARATUS.

GOOCH CRUCIBLE HOLDER.



A NEW article in rubber is the piece of laboratory apparatus shown in the illustration. This Gooch crucible holder is unique in design. The rubber stopper or plug is lined with a bell-shaped glass funnel tube permitting hot acid solutions to be filtered without danger of contamination. The taper of the plug is designed to fit flasks of various sizes of neck. One complete holder displaces the usual carbon tube, rubber tubing and stopper. [Eberbach & Son Co., Ann Arbor, Michigan.]

A Method for the Valuation of Washed and Dried Rubber.

By Frederick Dannerth, Ph.D., and Roscoe M. Gage.

[Dr. Dannerth and K. M. Gage submit this as a method upon which they have spent much time and which has given satisfactory results. They do not claim that it is the only method and invite comment and criticism.—The Editor.]

PART I.—GENERAL

IN the preparation of specifications for rubber goods, an extensive discussion has taken place concerning the use of such words as Para rubber, plantation rubber and *Hevea* rubber, because of the fact that it is impossible to distinguish these rubbers in the finished, vulcanized rubber goods. Some contend that it is more important that the product comply with certain physical or chemical tests. With this in mind, one of the authors has recommended the use of the phrase "pure fine Para rubber or its equivalent," so that it will be possible to use plantation rubber in those cases where experience shows that it is good. This in turn makes it necessary to define the term "equivalent," and after a careful consideration of all the elements involved the authors have adopted the following definition of this phrase:

"In specifications, a rubber shall be considered the equivalent of pure fine Para rubber, if, when tested in the following manner, according to a standard recipe, it will show a tensile strength at least equal to that of pure fine Para rubber."

(1) The standard recipe for compounding the Para rubber and the rubber which is to be compared with it shall contain the following ingredients:

Washed and dried rubber.....	50 per cent
Zinc oxide	37 per cent
Lead monoxide (litharge).....	10 per cent
Sulphur	3 per cent
100 per cent	

(2) The mineral powders shall not contain more than 0.5 per cent moisture and must be of such fineness that they can be washed through a 200-mesh sieve, leaving not more than 0.5 per cent of coarse particles. But all the particles must be fine enough to pass through a 100-mesh sieve.

(3) The rubber is to be broken down on a mixing mill, the mineral powders are to be added and the whole batch is to be mixed as quickly as possible.

(4) Each rubber compound is to be vulcanized in such a manner as to secure a maximum tensile strength, provided, however, that the test piece shall stretch from 2 to 14 inches without rupturing; the object being to provide a minimum elongation, so that the operator is enabled to vulcanize the specimen to the greatest possible strength under that condition.

(5) Method of testing. The tensile strength test is to be carried out on a Scott testing machine or a machine of similar type, power driven. The vulcanized test specimen at least six inches in length is scribed with bench marks two inches apart. The jaws of the testing machine are adjusted so that the maximum distance between them is four inches. The test specimen is placed in the jaws and the machine is operated so that the jaws separate at the rate of 20 inches per minute. No test will be considered unless the test specimen breaks between the bench marks.

(6) The stretch is carried out simultaneously with the tensile strength test. In order to fulfill the requirements of the official test, the bench marks must be at least 14 inches apart before the test specimen breaks.

(7) In order to obtain the record for the highest possible tensile strength, at least three samples of the rubber compound shall be vulcanized in each instance, and in case of dispute five samples shall be tested.

(8) Tensile strength shall in all cases be calculated from the cross sectional area of the original sample.

(9) The rubber compound shall be vulcanized in a steam press in the form of a sheet not greater than $\frac{1}{8}$ inch in thickness, and the test specimen shall be cut from this sheet by means of a die.

(10) The mineral powders used in the recipe are preferably dried in vacuum, at a temperature five degrees above the boiling point of water in vacuo. They shall contain not more than 0.5 per cent of moisture.

The authors are of the opinion that this method could be adapted to advantage for the valuation of washed and dried rubber for special conditions. For example, a compound might be prepared containing 40 per cent rubber, 47 per cent zinc oxide, and another might be prepared containing 30 per cent rubber, 57 per cent zinc oxide, the percentage of the other ingredients being so adjusted as to total 100 per cent.

It will be noted that this method has been so devised as to be of the most general applicability. No provision has therefore been made for determining such properties of the compound as: (1) aging test; (2) resistance to abrasion; (3) resistance to steam under pressure; (4) resistance to oil or volatile solvents; (5) dielectric properties; (6) resistance to dry heat; (7) flexibility at low temperatures.

It is now generally recognized that these tests can be carried out only on specific compounds which are prepared in the factory for certain rubber products. They are, in other words, "specific tests."

THE MINERAL POWDERS.

The fineness of the mineral powders used in the recipes is preferably determined by the following method, adapted from the standard cement test. Wire cloth for standard sieves for rubber pigments shall be woven (not twilled), from brass, bronze or other suitable wire, and mounted without distortion on frames, not less than 1.5 inches below the top of the frame. A circular sieve, 8 inches in diameter, is preferred. A standard 200-mesh sieve is one having nominally a 0.0029 inch opening and 200 wires per inch, standardized by the United States Bureau of Standards, and conforming to those requirements.

The test shall be made with 50 grams of the mineral powder. The sieve shall first be thoroughly cleaned. The mineral powder shall be placed on the 200-mesh sieve. The powder shall be well distributed over the sieve and shall then be gently sprayed with a jet of water such as would emanate from the water wash bottle commonly used by chemists. The sieve should be turned frequently. The operation should continue until not more than 0.05 gram passes through in one minute of continuous sieving. The fineness shall be determined from the weight of the residue on the sieve expressed as a percentage of the weight of the original material.

The percentage of the residue shall not exceed 0.5 per cent, but all particles must be fine enough to pass through a 100-mesh sieve.

PART II.—EXPERIMENTAL

All the tests enumerated in this paper are based on batches of compound weighing 500 grams each. The time consumed for the several preliminary operations was:

	Minutes.
1. Weighing out one batch.....	10
2. Milling or mixing one batch.....	20
3. Allowance for resting after milling.....	45
4. Placing in the press, vulcanizing for 30 minutes and removing from the press: total.....	45
5. Allowance for resting after vulcanizing.....	210

6. Cutting out the test piece, scribing, gaging, testing for strength, calculating results: total for five test pieces cut from one slab..... 30

Total time consumed for entire test and report.... 360

NOTE 1. The optimum cure for this particular compound was found to be: 30 minutes at 50 pounds steam pressure (= 297 degrees F. = 147 degrees C.). All specimens were allowed to rest 210 minutes after vulcanization, before testing for strength, but it was found that specimens which had rested 24 hours after vulcanization showed a very slight increase in strength.

NOTE 2. The tests were carried out on Fine Para rubber, Hevea Ribbed Smoked Sheets, and Hevea First Latex Gristly crepe.

NOTE 3. The rubber compound was vulcanized in a steam press in the form of a sheet not greater than $\frac{1}{8}$ inch in thickness. The test specimen was cut from this sheet by means of a die, not less than 0.25 inch wide at the constricted part. (See "The Journal of Industrial and Engineering Chemistry," 1912, page 452).

NOTE 4. Batches weighing 500 grams each were prepared according to the following recipe:

	Per Cent.
Rubber	50
Zinc oxide	37
Litharge	10
Sulphur	3
Total	100

(A) With Fine Para Rubber:

Experiment No. 1. Vulcanize for 30 minutes at 50 pounds. Allow specimen to rest three hours after vulcanization. Tensile strength, 3,053 pounds; elongation, 2 to 14.4 inches.

Experiment No. 2. Vulcanize for 40 minutes at 50 pounds. Tensile strength, 2,928 pounds; elongation, 2 to 13.9 inches.

(B) With Hevea Ribbed Smoked Sheets:

Experiment No. 3. Vulcanize for 30 minutes at 50 pounds. Tensile strength, 3,167 pounds; elongation, 2 to 14.1 inches.

Experiment No. 4. Vulcanize for 40 minutes at 50 pounds. Tensile strength, 2,935 pounds; elongation, 2 to 13.6 inches.

(C) With Hevea First Latex Gristly Crêpe:

Experiment No. 5. Vulcanize for 30 minutes at 50 pounds. Tensile strength, 2,827 pounds; elongation, 2 to 14.0 inches.

Experiment No. 6. Vulcanize for 40 minutes at 50 pounds. Tensile strength, 2,533 pounds; elongation, 2 to 13.4 inches.

The "Factor of Elongation" is the term applied to the quotient obtained by dividing the original length into the ultimate length. If a specimen stretches from 2 to 14.4 inches, the factor of elongation is 7.2.

GULF SULPHUR OUTPUT INCREASING.

In order to meet the increasing demand for sulphur and its products, the output of the great mines in Texas and Louisiana is being greatly increased. The Freeport Chemical Co., Freeport, Texas, a subsidiary of the Stauffer Chemical Co., San Francisco, California, has placed in operation the first unit of a new plant for the manufacture of sulphuric acid and other products which, when completed, will represent an investment of about \$450,000. The mines are situated near the mouth of the Brazos River and it is proposed at a cost of \$455,000 to deepen the present 18-foot channel to 25 feet so as to accommodate larger vessels to meet the shipping demand.

Last year the United States used approximately 900,000 tons of sulphur, three times the annual consumption before the war. It is estimated that the 1917 demand will be 1,200,000 tons and that 1,600,000 tons will be the annual requirement if the war continues.

FALL MEETING OF THE RUBBER SECTION OF THE AMERICAN CHEMICAL SOCIETY.

[Dr. Tuttle's appeal to make the chemical symposium and program of papers at the forthcoming meeting even more practical and constructive than last year is so well stated and covers the ground so thoroughly that his announcement is published in full. During this great national crisis, when trade, commercial and professional conventions for the exchange of ideas regarding efficiency are far more necessary than in times of peace, all rubber chemists should make an extra effort to lend a full measure of cooperation.—Editor.]

THE Fall meeting of the American Chemical Society will be held in Boston during the week of September 10 to 16, 1917. The Rubber Section will hold its session at that time, and while the date has not been decided upon, it will probably be on Wednesday, Thursday, or Friday, September 12, 13 or 14.

I am particularly anxious to get the program arranged as soon as possible, so as to permit its wide distribution in plenty of time before the meeting so that members may easily arrange to be present. I wish, therefore, that all those who expect to present papers to the meeting will send me the titles at the earliest moment. We are going to try a new stunt this year: we want abstracts of all papers to be in the hands of the secretary at least a week before the meeting. These will be mimeographed, and placed in the hands of those present at the meeting. We expect this to stimulate discussion and bring out valuable and helpful criticisms. The success of the symposium of last year has encouraged us to repeat the idea again this year. The following subjects have been proposed:

1. Determination of total sulphur.
2. Determination of rubber.
3. Organic accelerators.
4. Crude rubber resources of the United States.

Those who care to prepare a short talk on one of these subjects, preferably covering their own experience, should so notify the secretary. This need not be a formal paper on the subject, but of course should be the result of careful study. We are also open to suggestions as to other topics which might be of interest.

At our meeting last year, there were present over one hundred members and guests. A glance at the proceedings as reported in THE INDIA RUBBER WORLD in October, November and December, 1916, will give you some idea of the value of the meeting. Whether or not this year's meeting will prove equally profitable will depend largely upon the support which the meeting will receive from the rubber chemists. No better opportunity than this is offered to meet your fellow chemists from all over the country and discuss such problems as do not involve trade secrets, the solution of which would be of considerable value in your laboratory. This phase of the Rubber Section's activities would in itself justify its existence.

Some time during the next two weeks I wish every member of the Section would take time to write me a letter giving at least one suggestion as to how to run this next meeting. I know that if some of the suggestions given to me after the meeting last year had been received a few weeks earlier, we would have had a better meeting.

All those who were not present at the last meeting, and who are interested in receiving advance notices of the program, etc., should send their names in at once, so that they may be placed on the mailing list.

The following will be of interest as showing the geographical distribution of those who registered at the 1916 meeting. In addition, there were about 15 or 20 who failed to register. New York City 22, New York State 9, Massachusetts 16, New Jersey 15, Pennsylvania 12, Ohio 11, Rhode Island 3, Connecticut 4, Western States and Canada 10.

JOHN B. TUTTLE, Secretary.

Address: Bureau of Standards, Washington, D. C.

OAKITE, A NEW CLEANSER.

OAKITE is a non-explosive white powder soluble in water and intended to replace naphtha, potash or soap in cleaning rubber goods and molds.

A solution consisting of one ounce to a gallon of water is a good recipe for molded goods. Inner tubes may be cleaned by soaking in a similar solution at a temperature of 100 degrees F.

A solution of two ounces to a gallon of warm water is recommended for removing the bloom from sheet rubber. Power brushes and rubber mats may be cleaned with a solution of this strength. Grease and dirt are also removed from rubber soles by applying it with a rag or sponge. In making footwear, the lasts or trees are cleaned before being used and the finished boot after being built up.

A solution of four ounces to the gallon of water and applied with a wire brush is suitable for cleaning molds. Bicycle tires may be soaked in it to remove the bloom, and casings may be washed with it after using emery cloth on the bad spots, care being taken not to wet the inside of the casing.

The bloom is removed from hot water bottles by putting them in a washing machine containing six ounces to the gallon of water, the water then being heated to the boiling point for 20 minutes.

A turning compound used in manufacturing round hard rubber articles consists of one ounce of Oakite and one quart of kerosene to a gallon of water.

Oakite does not blister nor discolor rubber goods or fabrics, nor affect the cement in any way. It throws off no fumes, will not injure the hands of operators and is inexpensive, costing only 12½ cents per pound.

THIRD NATIONAL EXPOSITION OF CHEMICAL INDUSTRIES.

The Third National Exposition of Chemical Industries is to be held at the Grand Central Palace, New York City, during the week of September 24, this year. Preparations are in active progress, with an advisory committee composed of Chas. H. Herty, chairman; Raymond F. Bacon, L. H. Baekeland, Henry B. Faber, Colin G. Fink, Bernhard C. Hesse, A. D. Little, R. P. Perry, Wm. Cooper Procter, E. F. Roeber, G. W. Thompson, T. B. Wagner, Utley Wedge and M. C. Whitaker. The managers, Charles F. Roth, Adriaan Nagelvoort, and F. W. Payne, report that the exposition will this year be larger and more interesting than its predecessors, and that manufacturers of rubber goods, textiles and industrial chemicals will be well represented. At the close of the last exposition much of the space available on two floors then used was re-engaged by exhibitors for this coming exposition. The present time sees these floors completely taken and the greater part of the available space on the third floor engaged.

A great section of exhibits showing the industrial opportunities our South presents in its raw materials will be known as the "Southern Opportunity Section," and a "Paper and Pulp Industry Section" has been provided. Many exhibits will be of interest to men from the rubber and textile industries. Many of the chemical and allied industry companies, notably dyestuffs companies, have so expanded their operations in the past year, and their products and interests have become so numerous that they require much additional space to make adequate showings.

The Bureau of Commercial Economics at Washington is this year again preparing many of the motion picture films that will be shown, and many exhibitors have now in preparation pictures showing phases in their work in the manufacture of their products. These will be of absorbing interest, having been photographed for the first time.

The program of speakers has not yet been announced, but we are informed that it will be composed of many of the nation's foremost men, and men who have come to the fore in the nation's hour of need.

INCREASING DEMAND FOR ASBESTOS.

The United States is one of the largest manufacturers of asbestos goods, but is not a large producer of crude asbestos. The supply of all grades in Quebec, Canada, is so large, so conveniently obtained, and the quality is so excellent, as to delay the development of asbestos deposits in the United States. The demand for high-grade asbestos has always been active, but recently, under the stimulus of war conditions, it has become still greater, and the available supply, although larger than before, is frequently not equal to the demand. In 1916 the total output of asbestos in the United States was 1,479 short tons. The imports during the same time, almost wholly from Canada, amounted to 116,162 short tons, making a total supply available for manufacture in the United States of 117,641 tons.

The prices for asbestos produced in the United States during 1916 are said to have ranged, according to grade, from \$15 to \$1,000 a ton. In 1915 normal prices ranged from \$10 to \$400 a ton. [United States Bulletin, 666-H.]

THE PRODUCTION OF TALC AND SOAPSTONE.

The total domestic production of talc is nearly 12 times the total imports, over one-third of which came from Canada. The talc of New York State is an especially good paper filler and is largely used for that purpose, although much goes into paints. The output of Vermont is used for the same purpose and also for foundry facing, rubber goods, and coating walls. A small amount is used for crayons. Talc for pencils, crayons, burners, and insulators comes almost wholly from North Carolina and Georgia and is cut in Chattanooga. The demand for talc of the highest grade is greater than the supply. Much of the material for toilet powders is imported. With the exception of compact material for pencils, burners, and insulators and the best grade for toilet powders the United States has a large reserve in nearly all the producing States. It is believed that by more searching field investigations the domestic output even of pencil and gas-burner talc as well as the best toilet powder grades may be greatly increased.

In 1916 there was a small production of soapstone in California, but almost the entire output of the United States came from Virginia, where there were four producing quarries. The total yield, including that of California, was 19,652 short tons. The United States has large reserves of soapstone and can, if necessary, greatly increase its output. [United States Bulletin 666-I.]

ANILINE CONCERNS CONSOLIDATED.

The National Aniline & Chemical Co., Inc., which was recently chartered at Albany, New York, is an amalgamation of several well-known concerns in the aniline industry, namely, of the firms of the Schoellkopf Aniline and Chemical Works, Inc., the W. Beckers Aniline and Chemical Works, Inc., the National Aniline and Chemical Co., the Benzol Products Co., The Barrett Co. and the Semet-Solvay Co.

The company is capitalized at \$2,000,000, being 200,000 shares at a par value of \$100 and 350,000 shares in common stock without par value. The stocks, however, have been taken by the firms concerned, in exchange for their properties. The company has plants at Buffalo, Brooklyn, and Wappingers Falls, New York, and at Easton, Marcus Hook, and Frankford, Pennsylvania. The organization proposes to cover the aniline industry from the raw materials to the finished products. The New York City office is at 244 Madison avenue.

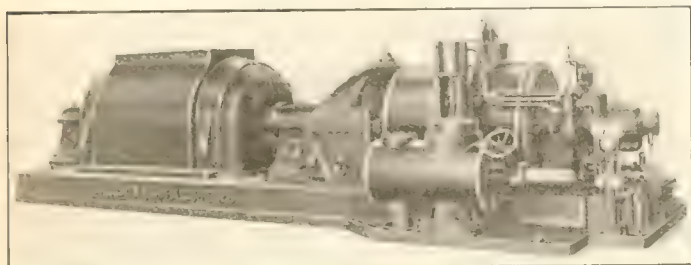
RUBBER-LIKE PRODUCT.

This invention is a condensation product of acetone or its homologues, formaldehyde or its isomers, and phenol or its homologues. [W. A. Betchy. Japanese patent No. 30,049 (September 16, 1916).]

New Machines and Appliances.

THE ALLIS-CHALMERS STEAM TURBINE AND ALTERNATOR UNIT

The widest application of the steam turbine is without doubt in turbo-generators for electric drive. The use of electric power in rubber mills has increased proportionately with the steady growth of the industry that ranks among the foremost consumers of electric energy. In all sizes of units above 200 kilowatts, the first cost, reliability and ease of operation place the steam turbine in the van of all prime movers. The large sized units that are now necessary in the principal rubber mills of this country are made possible by the steam turbine that is

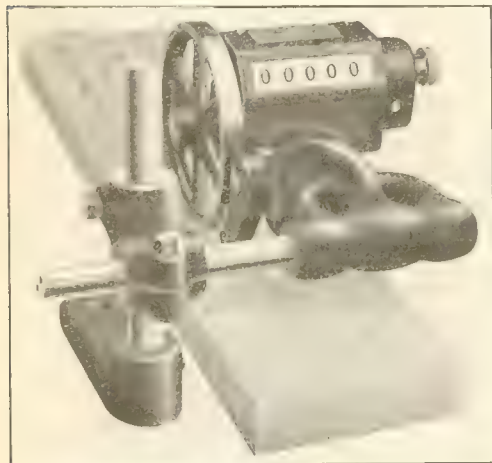


establishing records of economical operation heretofore thought impossible. Rubber manufacturers have been prompt in recognizing the advantages of electrical power and all of the larger plants and many of the smaller ones are equipped with electrical drives.

A recent installation in the plant of the Federal Rubber Manufacturing Co., Cudahy, Wisconsin, is here shown. It consists of a 3200-kilowatt high pressure condensing steam turbine and alternator unit of the standard Parsons type and will be used for generating alternating current for general use in the rubber mill. The characteristics of the electrical end are 60 cycle, 3 phase, 2300-volt, 80 per cent power factor. The steam end takes high pressure steam direct from boilers and exhausts into a high vacuum condenser. [The Allis-Chalmers Manufacturing Co., Milwaukee, Wisconsin.]

LINEAL MEASURE PRODUCTIMETER

In the manufacture of rubber goods an accurate record of the product of each machine is essential in computing the cost of manufactured articles. A measuring device that is particularly serviceable in recording the number of lineal feet produced by tubing machines is shown in the illustration. An adjustable bracket affords easy attachment to the front of the machine so that the measuring wheel rests lightly on the stock as it emerges from

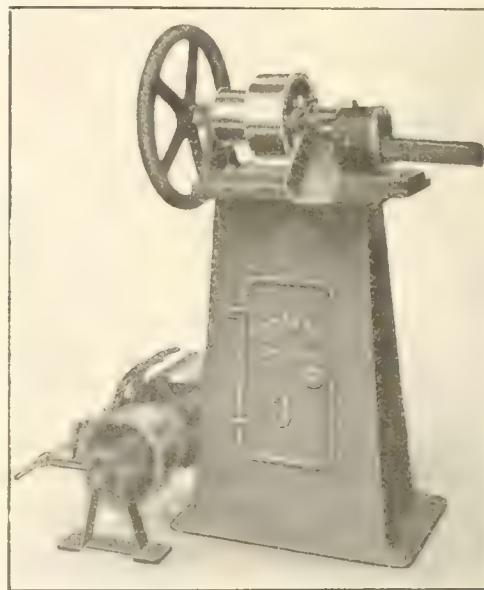


the head. The figures record actual feet, although the measuring wheel is 16 inches in circumference, which has been found the most practical size for all kinds of work. A leather-faced brake prevents the wheel from spinning when the end of the

stock is reached. Dirt-proof oil cups are provided and the working parts enclosed in a dust-proof case that may be locked to prevent it being tampered with. The counter weighs 15 pounds and is made in three sizes, the smallest counting up to 999, the medium size counting up to 9,999, and the largest will count 999,999. [Durant Manufacturing Co., Milwaukee, Wisconsin.]

STOCK CUTTING MACHINES.

Machines for cutting tubing machine stock are used in every mill where molded rubber goods are made and are therefore not particularly novel. However, the machine here shown, while



suitable for a variety of work, is specially designed for cutting rubber heel stock. The machine is bolted to a hollow pedestal of substantial design that supports the bracket in which is journaled the cutter shaft driven by a two-step cone pulley. This shaft is provided with a fly wheel on the outer end, and the cutting

knife is mounted on the inner end in shearing clearance with the stock head. This head is adapted to hold the different bushings necessary in cutting stocks of various shapes and diameters and an adjustable stop is provided that regulates the length of stock to be cut.

This machine precludes the usual method of slabbing and dieing-out heel stock and, moreover, it may be used to cut stock for smaller articles, such as basin-plugs, fuller-balls, bumpers and many other forms of molded rubber goods. [Holmes Brothers, 500 South Peoria street, Chicago, Illinois.]

THE AUTOCALL SIGNAL SYSTEM.

Electrically operated signals for locating and calling to the telephone or the office, heads of departments who are employed somewhere in the factory have been in use for some time in the larger rubber mills. The advantages of the system are obvious and in the larger manufacturing establishments it is considered indispensable. As a natural result the system has been improved and its scope enlarged so that the Autocall system is now a recognized aid in modern rubber mills.

The Autocall central is a small, compact device that is placed within reach of the telephone operator. Where space is limited the central may be located in any convenient place and connected by cable with a plug board placed so that it is accessible to one or more operators.

The Autocall central and the remote call are both operated by a plug board similar to a telephone switchboard, with which all operators are familiar. To locate anyone, the operator inserts the plug in the hole corresponding to that person's signal, and by giving the motor a quarter turn the call is sounded at all

signal stations simultaneously any desired number of times at brief intervals. As the signals are being transmitted a colored prism pilot light in the central station cabinet indicates to the operator that the system is in operation.

Signal stations are located in the various departments of the mill and the signals are adapted to be heard under the varying noise conditions. Under ordinary conditions a gong is used,

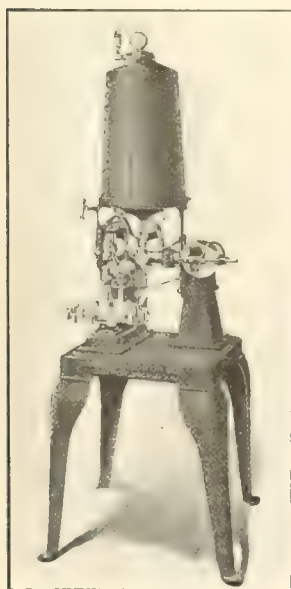


while in offices and laboratories the autotone signal is preferred. When extreme noise precludes a bell, steam or air whistles are substituted, and when air or steam is not available electric horns may be used.

One of the optional features of the service is the automatic ringing of a special signal, distinctive from the call signals, for starting and stopping work, while another feature provides means for summoning the watchman to the gate when the factory is closed. [The Autocall Co., Shelby, Ohio.]

CEMENT TUBE FILLING AND CLOSING MACHINE.

When it is considered that the tool box of almost every motor car, motorcycle and bicycle contains a tube of rubber cement for emergency purposes, it is not difficult to estimate that millions of these little accessories are produced annually. The tubes are filled with cement at the large end which must be closed and sealed with a special metal clip to prevent leakage. The filling and closing operation is automatically performed on the machine here illustrated, which is used by many of the leading cement manufacturers. As will be seen, the machine is mounted on a substantial bed-plate supported by suitable legs, and is driven by belt power or motor drive, if desired, only $\frac{1}{4}$ horse power being required.



The container is designed to carry sufficient air pressure to facilitate the flow of the rubber cement. This air pressure may be taken from any source available, but must not exceed 20 pounds per square inch at the receiver on the machine. Any pressure less than this may be used, depending

on the viscosity of the material which is being handled.

The machine will handle tubes ranging from $\frac{1}{2}$ to $1\frac{1}{4}$ inches in diameter and from 2 to 6 inches in length and has a capacity of 25 to 30 tubes per minute. It occupies a floor space of 30 by 30 inches and weighs 405 pounds. [Arthur Colton Co., Detroit, Michigan]

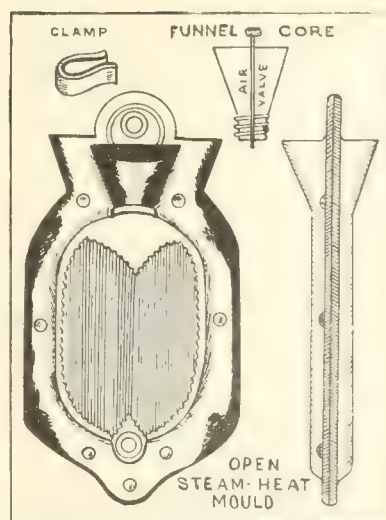
STAMPED METAL RUBBER MOLDS.

The time-worn method of making cast iron or steel molds adapted to the manufacture of hot-water bottles, bulbs and hollow toys is a matter of considerable expense, particularly when large quantities of goods are produced. While the following process is admittedly tentative and limited in application, the idea is practical and of sufficient suggestive value to make it interesting.

Stamping or drawing plates of soft steel forming a multiplicity of forms by means of dies and hydraulic pressure is a highly specialized branch of mechanical art. The steel maker is called upon to provide special sheet material of different gages, possessing the proper strength and ductility for the cold stamping process. All manner of forms with embossed and engraved surfaces are accurately reproduced in sheet metal by specially constructed dies in a hydraulic press.

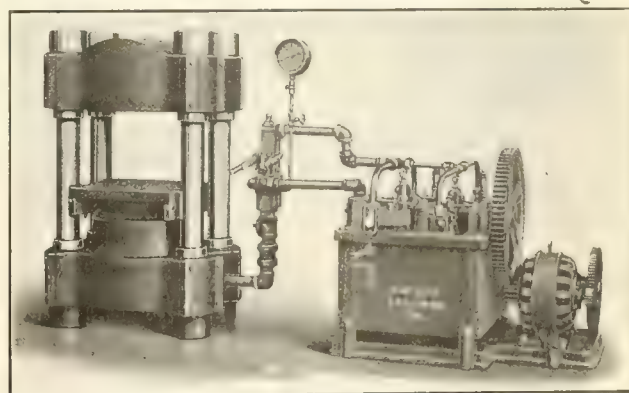
For example, the first steps in making stamped hot-water bottle molds would be to construct the dies. This operation will, of course, be costly, but a thousand or more molds may be formed in the press with these dies at a ridiculously small

cost when compared to that of making the same number of cast iron or steel molds. Two pairs of dies, called a die and force, are made, consisting of a male and female die for each half of the mold. Soft steel blanks are forged or otherwise rough-shaped by machining, and by milling and hand cutting, two pairs of dies comprising a die and force are made in exact reproduction of each half of the water-bottle and provided with dowel projections and depressions for alining the mold parts. The dies



are then case-hardened and fitted to the die press.

The mold parts are stamped separately from sheets of steel from 1-16 to $\frac{1}{8}$ inch thick, depending on the character of the mold to be made. The outfit recommended for this work consists of a 600-ton hydraulic press connected to a motor-driven four-plunger pump. The press is of the four-column type,



working at a pressure of 6,000 tons per square inch. The ram has a six-inch stroke and the platens measure 23 by 24 inches, operation of the press being controlled by a hand lever.

After the stamping operation the upper and lower parts of each mold are assembled and require very little fitting, spring

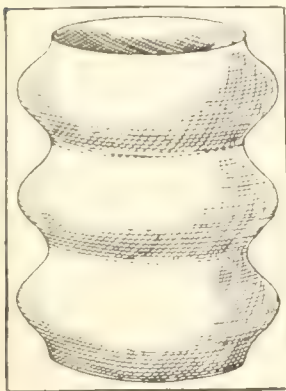
steel clamps being provided for holding the two sections together. The part remaining to complete the mold is a solid metal funnel core provided with an air valve for inflating the water bottle during vulcanization.

In making bottles the blanks are cut from the sheeted stock and placed in the mold as usual. The clamps are sprung over the edges, holding the mold sections firmly together. Molds by the thousands may be then hung in a heater, inflated and cured in open steam.

Should this method prove successful in the manufacture of certain rubber goods the expense of mold equipment and factory costs would thereby be greatly reduced. [Schoder & Lombard Stamp & Die Co., Inc., 251-253 Canal street, New York City.]

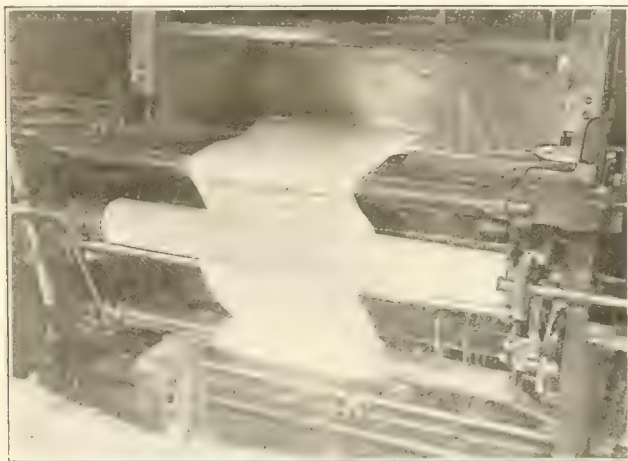
THE LANGER TIRE FABRIC AND LOOM

Inventive effort to eliminate friction between the plies of fabric used in ordinary pneumatic tire construction is now being directed toward reducing the number of fabric plies in the carcass; moreover, it has been found impractical to wind heavy fabric on a



A specially woven fabric that may be used in one or two ply fabric construction, and the loom on which it is made, are shown in the accompanying illustrations. The fabric is woven in continuous tubular forms, each possessing the correct shape and diametrical measurement of the intended tire carcass. These sections are cut off, impregnated or frictioned with the rubber and made up on a collapsible core in the usual way.

The loom is of regular construction with the exception of the fan-shaped reed which is automatically raised and lowered during the weaving operation. When the wide part of the reed beats in the weft the fabric is correspondingly wide and when the



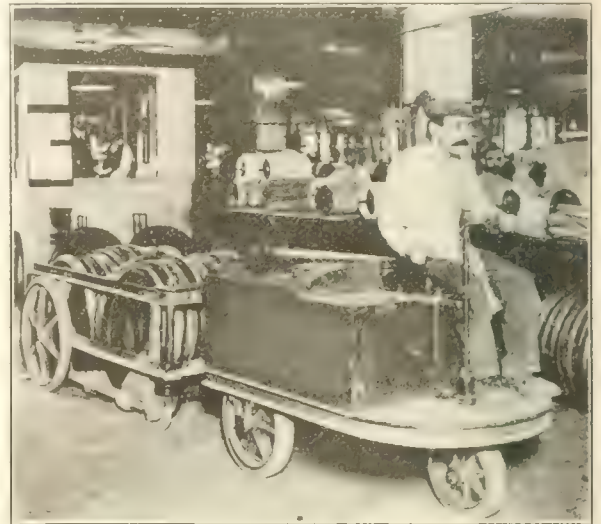
narrow part is in position to beat in the weft the product is narrow, thus forming the corrugated contour of the tubular fabric. [Henry Langer, Middletown, Connecticut.]

THE MERCURY TRACTOR.

It is now quite common in a modern rubber mill to see electrically-driven industrial trucks and trailers carrying iron molds and cores, raw materials, finished and partly finished products from one department to another with ease and rapidity. The industrial haulage problem has, of recent years, become more important as factory additions are being made and floor space multiplied. The surrounding conditions and requirements vary

greatly in different mills, so that a type of power unit that will give satisfactory service under a variety of conditions is desirable.

The three-wheel tractor here illustrated has a small turning radius and is generally adaptable to rubber mill requirements. The power is obtained from storage batteries that are compactly grouped within the covered body of the car. The heavy duty motor is mounted directly on the axle and a mercury type controller with automatic safety return is provided. Three speeds are available, one forward and two reverse. No resistance is used. The steering lever is directly connected to the front

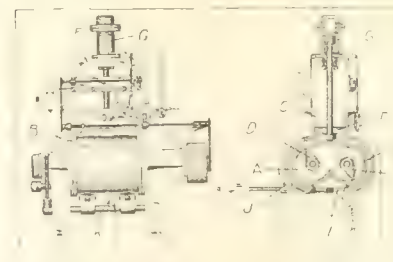


wheel, which is only permitted to turn in the angle of the minimum turning radius of the car. The foot pedal is connected to the brake wheels on the rear axle for ordinary service. Mercury safety and emergency brakes are attached to the driving shaft. This brake is set at all times excepting when the driver is seated, and instantly stops the car when he arises from the seat. In the illustration the tractor is shown hauling a trailer loaded with iron tire cores. [Mercury Manufacturing Co., 4118 S. Halstead street, Chicago, Illinois.]

MACHINERY PATENTS.

THE BANBURY AUTOMATIC ENCLOSED MIXER.

A MIXING machine of the enclosed type for automatically mixing and dumping the charge of massed rubber is here described. A front elevation and a vertical sectional view are shown



in the illustration, in which *A* and *B* are cylinders that open into the chamber *C*. The two rotors *D* and *E* are provided with blades whose peripheral edges are adjacent to the walls of the cylinders. Supported by the housing *F* is the cylinder *G* in which operates a

piston head connected by means of a rod to the weight *H*, that reciprocates in the chamber *C*.

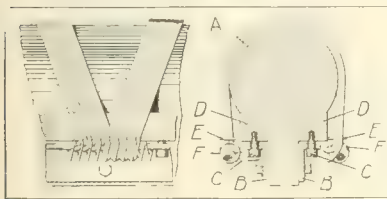
The upper face of the discharging door *I* forms part of the mixing chambers and is hinged on the shaft *J* and provided with a counterweight. The door is locked in place by two rollers mounted on yokes fixed to the shaft *K* that engage the door lugs. The cylinders, bottom door and mixing blades are hollow so that they may be water-cooled. In mixing rubber materials a certain number of revolutions is required and as this varies with

different materials a device is provided that rings a bell when the predetermined number of revolutions has been completed.

In commencing operations, the door being closed and the weight raised, the material is placed in the machine, the weight lowered and the rotors started. After a predetermined number of revolutions, air or water is automatically admitted to the upper cylinder, the weight is raised and dry ingredients are fed into the machine. At the end of this period the weight is automatically lowered and bears on the material during the mixing operation. When this is completed the mechanism controlling the door-locking device is operated, the door released and, swinging downward, discharges the contents of the cylinders. [Fernelly H. Banbury, Ansonia, assignor to Birmingham Iron Foundry, Derby—both in Connecticut. United States patent No. 1,227,522.]

ANCHORAGE FOR CORDS OF CORD TIRES.

This invention relates to the true cord tire in which the parallel cords comprising the carcass are laid over the core at an angle and anchored at the beads.



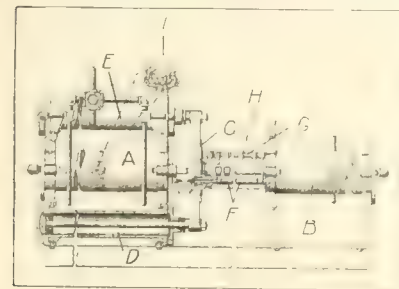
In the illustration, *A* is the core with an internal rib to each side of which two angle-shaped rings *B, B*, are bolted. Screws *C, C*, serve to hold in place the two segmented rings *D, D*, that are provided with cord locating pins *E, E*. Two helical, endless wire coils *F, F*, having one-half the number of convolutions as there are pins on each side of the core, are located just within the pins by any temporary means.

When the coils of wire have been fixed in position, one end of the cord is anchored in any suitable way and the cord is first doubled upon itself and the bight slipped over one of the convolutions of the wire. The cord is again looped or doubled upon itself and the bight placed over a convolution of the opposite wire coil. When the cord is pulled tightly about the core the bights will be slightly separated and drawn upward on the inside of the coils.

When the inner layer of cords has been placed in position on the core, the last run will come into position near the first end which was temporarily anchored in position. The two ends may then be tied together, or the same cord continued without cutting so that the second layer of cords is formed in a manner similar to the first except that the angle of the cords is opposite to that of the first layer. [Benjamin L. Stowe, Jersey City, New Jersey, assignor to Morgan & Wright, Detroit, Michigan, United States Patent No. 1,228,144.]

RUBBER FOOTWEAR ROLLING MACHINE.

This machine is primarily designed to apply air pressure to rubber footwear while on the lasts and prior to vulcanization. The illustration is a side elevation of the machine that comprises two tandem air cylinders *A* and *B*, the inner ends being open and spaced apart, while the outer ends are closed.



A head *C* connected to pistons operating in hydraulic cylinders *D* and *E*, reciprocates between the open ends of the tandem cylinders. A hollow bar or last carrier *F*, provided with nipples for supporting the lasts, projects from the outer face of the head. Two arms loosely mounted on the last carrier, support on their outer ends a shaft *G*, on which are arranged a number of presser arms *H*, that press the lasts on the

carrier bars, thereby insuring an air-tight joint. From the inner face of the reciprocating head a last carrier identical to the one just described projects in an opposite direction; however, this is not shown in the illustration. The four-way hydraulic valve controlling the reciprocal movement of the head and the three-way valve controlling air pressure in the cylinders are operated by a cam movement shown at *I*, that is, transmitted to the valve stems by chain gearing.

The shoes on the perforated lasts are placed on the carrier bar, being held in place by the presser arms and the clutch mechanism started that operates the hydraulic valve. The head then moves to the right, entering the shoe carrier in the right hand air cylinder and hermetically closing it at the same time. Air is then automatically admitted to the cylinder, thereby applying pressure to the shoes on the lasts. Entrapped air escapes through the lasts and the hollow carrier bar to the atmosphere. When the machine is reversed the air is automatically released from the right cylinder and the hydraulic pistons move the head to the left, entering the left shoe carrier in the corresponding air cylinder when pressure is applied to the shoes. [Alfred A. Glidden, Watertown; Edgar P. Dorman, Boston; George L. Finch, Brighton, assignors to Hood Rubber Co., Watertown—all in Massachusetts. United States patent No. 1,228,904.]

OTHER MACHINERY PATENTS.

THE UNITED STATES.

- 1,225,779. Apparatus for treating rubber articles. J. T. Crowley, assignor to The Beacon Falls Rubber Shoe Co.—both of Beacon Falls, Conn.
- 1,225,845. Tire repair vulcanizer. F. M. Navsmith, T. J. Gillaspay and F. D. Carl—all of Davenport, Iowa, assignors of one-half to said T. J. Gillaspay and one-half to A. D. Brownlie—both of Davenport, Iowa.
- 1,226,289. Apparatus for making rubber stamps. R. Wilday, New York City.
- 1,226,949. Machine for treating sheet rubber. M. H. Clark, Hastings-on-Hudson, N. Y., assignor to The Goodyear Metallic Rubber Shoe Co., Naugatuck, Conn.
- 1,227,509. Tire mandrel. H. B. Wallace, St. Louis, Mo.
- 1,228,196. Tire building machine. G. F. Fisher, Roselle, N. J., assignor to The Hartford Rubber Works Co., Hartford, Conn.
- 1,228,225. Apparatus for recovering solvents. James Lynah, Newburg, N. Y., assignor to E. I. du Pont de Nemours Powder Co., Wilmington, Del.
- 1,228,964. Heel-applying apparatus. J. E. Perrault, Belmont, and H. G. Ellis, Watertown—both in Massachusetts.
- 1,229,417. Flexible coupling. L. Daft, Rutherford, N. J., assignor to Electro-Chemical Rubber & Manufacturing Co., a corporation of N. J.

THE UNITED KINGDOM.

- 102,854. Solid rubber tire machine. T. H. Roberts, Faringdon House, Leyland, and F. Cole, Ribbles Bank Mills, Preston—both in Lancashire.
- 104,712. Bias cutter and winder. W. J. Mellersh-Jackson, 28 Southampton Building, London. [Firestone Tire & Rubber Co., Akron, Ohio, U. S. A.]
- 104,713. Work bench or table for rolling tire tubes. W. J. Mellersh-Jackson, 28 Southampton Building, London. [Firestone Tire & Rubber Co., Akron, Ohio, U. S. A.]
- 104,914. Rubber roll adjustment. J. Hodgins, 5. Montpellier Terrace, Wellington Road, Cork, Ireland.
- 105,114. Collapsible core. Ajax Engineering Co. and I. Cox, Arthur street, Birmingham.

THE DOMINION OF CANADA.

- 174,903. Tire building machine. J. T. Lister, Cleveland, Ohio, U. S. A.

THE FRENCH REPUBLIC.

- 482,304 (July 20, 1916). Improvements in mold presses. C. H. Gray.

PROCESS PATENTS.

THE UNITED STATES.

- 1,226,236. Method of manufacturing tires. E. E. A. G. Meyer and G. W. Seiberling, assignors to Morgan & Wright—all of Detroit, Mich.
- 1,226,481. Process for forming fabric-lined rubber articles. J. W. Donnenwirth, Akron, Ohio.
- 1,227,427. Method of making tire casings. H. F. Graham, Long Island City, and A. C. Schwartz, New York City—both in New York.
- 1,228,099. Process of manufacturing pneumatic tire covers. J. W. H. Dew, London, England.
- 1,228,458. Process of impregnating fabrics with rubber. I. S. McGiehan, New York City.
- 1,229,175. Process of manufacturing inner tubes. W. G. Christopherson, assignor to Morgan & Wright—both of Detroit, Mich.

THE UNITED KINGDOM.

- 104,661. Treating india rubber. A. E. Alexander, 306 High Holborn, London. (Morgan & Wright, Bellevue avenue, Detroit, Michigan, U. S. A.)
- 104,793. Marking electric cables. J. O. Callender, Calluna, Heathside Road, Woking, and Callender's Cable & Construction Co., Hamilton House, Victoria Embankment, London.

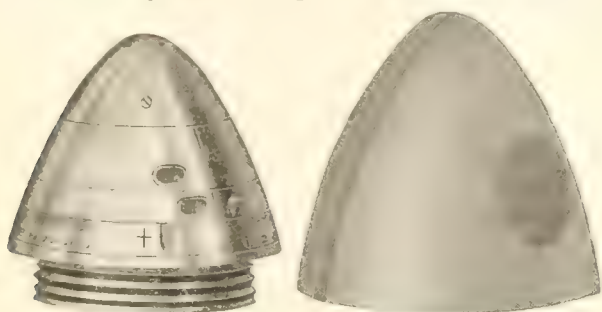
THE DOMINION OF CANADA.

- 174,864. Method of making rubber sole shoes. L. C. Colt, Bristol, Rhode Island, U. S. A.

New Goods and Specialties.

RUBBER FUSE COVER.

Still H cases are loaded in rooms maintained at a temperature of approximately 80 degrees F., and it is of the utmost importance that the exploding charge be kept "bone dry" until the shell is placed in the gun. The covers ordinarily used



for these uses to keep moisture from affecting the exploding charge while being carried from point to point have been made of copper, but the recent adaptation of rubber as material for the covers has proved thoroughly satisfactory, and large shipments of these shells, kept in perfect condition by a rubber cover such as is shown herewith, are now sent across the Atlantic to the firing line. [Canadian Consolidated Rubber Co., Limited, Montreal, Canada.]

DIVING CAP WITH SPONGE RUBBER RING.

The newest idea in bathing caps intended for actual diving and swimming, shown in the accompanying illustration, has a



patented waterproof headband with a sponge rubber ring. The roll edge conforms to the shape of the head, fitting tightly over the hair and ears and keeping them thoroughly dry and comfortable. This cap is made of pure gum in the natural color only, and in three head sizes. In order to permit the sponge rubber ring being rolled or adjusted to any desired position on the head the cap is made deeper than

ordinary bathing caps. The Faultless Rubber Co., Ashland, Ohio.]

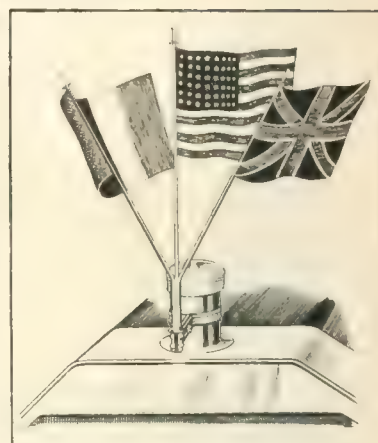
ROUND ELASTIC GARTER WITH CLASPS

A novelty in women's round garters clasps around the leg, thus avoiding the uncomfortable necessity of stooping over to put them on. A device is also afforded for making the garter larger or smaller and the clasps contain no metal or other corrosive material. The elastic band is of silk cable web or mercerized silk cable web, three-quarters of an inch wide, in white, sky, lilac or pink, ornamented with handsome ribbon bows. [Ivory Garter Co., 601-611 Baronne street, New Orleans, Louisiana.]



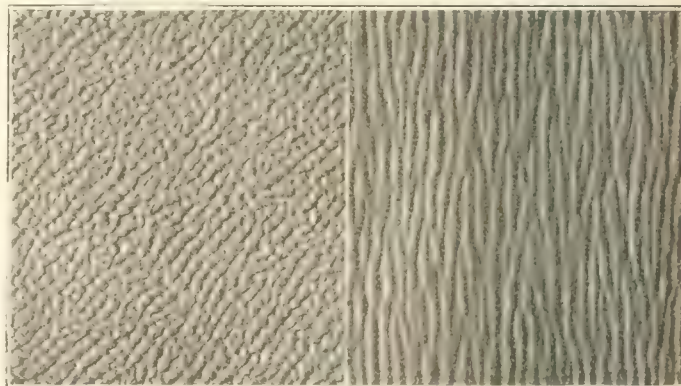
RUBBERIZED FLAGS.

The American flag flanked by the French and the British and attached to the front of automobiles is a popular expression of patriotism and allied sympathies which has recently been made more enduring by the use of rubberized silk in their manufacture. This renders them impervious to the effects of damp or rainy weather. The three flags are upheld by metal rods, brass-tipped, and a metal clamp secures them to the radiator of the car. [E. J. Willis Co., 85 Chambers street, New York City.]



DRIDEK AUTOMOBILE TOPPING.

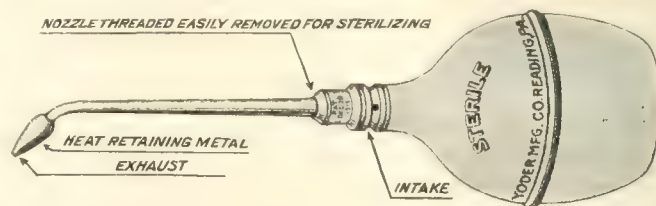
DrideK Rubber and DrideK Leather are the trade-names for a new rubberized fabric for automobile tops. It is a three-ply composition material, very soft, pliable and easy to work. It is



claimed to be absolutely waterproof and to afford unexcelled service under all conditions. Samples of DrideK rubber and leather are shown in the above illustration. [L. J. Mutty Co., 175 Congress street, Boston, Massachusetts.]

SANITARY DENTAL CHIP BLOWER.

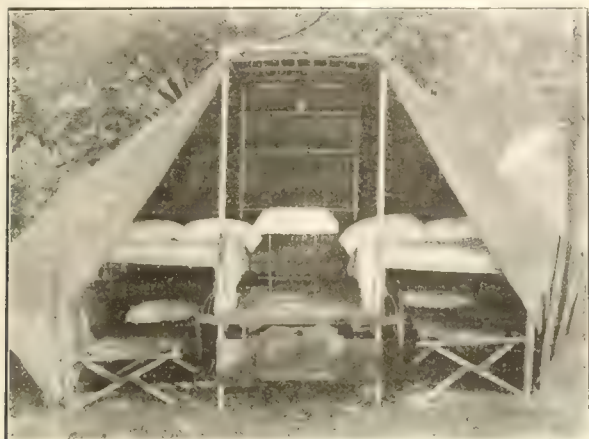
The old style chip blower used by dentists was a dangerous instrument, since it made possible the transmission of bacteria from one mouth to another by the entrance and ejection of air



through the nozzle. In the new type of blower shown herewith, the air does not enter through the nozzle, a special valve being provided next to the rubber bulb and a double-acting valve in the tube, so that germ-bearing matter cannot be drawn in. Red or slate-colored rubber is used for the bulbs. [Yoder Manufacturing Co., 528 Penn Square, Reading, Pennsylvania.]

THE TWIN BED OUTING TRAILER

A complete camp on wheels affording weatherproof shelter for six people is shown herewith. Considering its capacity, this trailer is light and easy to haul, weighing only 571 pounds with all equipment. It has two wheels equipped with pneumatic or solid rubber tires, and the side curtains are made of heavy rubberized drill. A patented canopy top-raising device operates on the same principle as a car window, the tent, which is at-

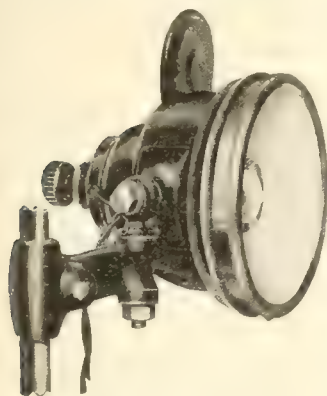


tached to the inner edges of the top, automatically dropping into place. Three shelves attached to the roof also drop into place when the canopy is raised. The beds slide readily into position and are easily adjusted to the corner poles. A patented ice-box is carried at the rear, under the end, and an unusual amount of storage room is afforded. The body of the trailer when folded for transportation is less than 7 feet long, 4 feet wide and 12 inches deep.

As all parts are made sufficiently strong for heavy usage, it is only necessary to remove the tent and beds to provide a practical commercial trailer. [Sorlien Ceiling Bed Co., 406-16 Sixth avenue, South, Minneapolis, Minnesota.]

THE RED SPOT SEARCHLIGHT.

Among many advantageous features this lighting apparatus contains a rubber gasket between the glass and the bezel of the spotlight which effectually prevents the entrance of any particles of dust or moisture. The "Red Spot" is a powerful searchlight for use on motor cars or on boats, in making landings or navigating dark and unfamiliar channels. A very simple and practical double swivel bracket mounts the spotlight and six feet of double conductor, flexible cord, weatherproofed and having copper terminals for attaching to the battery or lighting system, is supplied. A special feature is the arrangement by which the spotlight may be instantly changed to a glaring red danger signal. An adjustable mirror is mounted on the body of the light. [The F. W. Wakefield Brass Co., Vermilion, Ohio.]



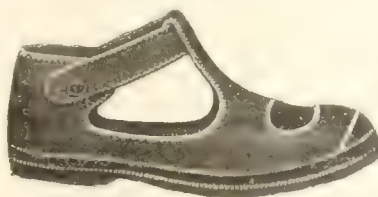
CANVAS SHOE CLEANING ERASER.

Rubber has for some time been recognized as a serviceable cleaning agent for white canvas shoes. Now a manufacturer of shoe dressings and rubber cements has placed on the market an eraser of white rubber specially designed for this purpose, of a compound to give high efficiency in erasing. It is about three inches long by one inch wide and one inch thick, an ade-

quate size and also convenient to hold in the hand. [Boston Blacking Co., East Cambridge, Massachusetts.]

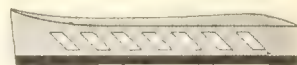
A SEASONABLE SANDAL

A neat sandal for children's wear is of tan duck with red rubber sole and foxing. The ankle strap passes through a loop in the instep strap and buttons over the ankle bone. A large opening over the toe joints and a low cut at the quarters insures coolness. The insole and counter are of leather. Further ornamentation is secured by cross stitch finish all around the edges. The same shoe is made of white duck, with white sole and foxing. [Canadian Consolidated Rubber Co., Limited, Montreal, Canada.]



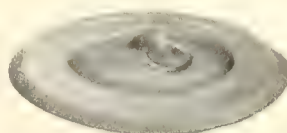
IMPROVED "ANTI-FLINCH" RECOIL PAD.

The latest improvement in recoil pads, shown herewith, comprises a cushion of soft red molded rubber, vulcanized to a hard rubber base plate. Through the soft cushion there are oblong slanting holes, which slant at an angle of 45 degrees in line with the gunstock. When the gun is discharged and pressure is brought to bear on the pad, the walls of rubber fold or lap on each other and spring back in their normal position when the pressure is relieved. This patented feature takes up the recoil and eliminates the upward whip of the muzzle of the gun, and is of great assistance when shooting "doubles" at the traps and where rapid firing is necessary. [Jostam Manufacturing Co., 1038 Montana street, Chicago, Illinois.]



"VERIBEST" FORCE PUMP AND SINK STOPPER.

A molded circular piece of red rubber about five and one-half inches in diameter, with a small metal ring securely held in the center, forms a handy accessory that is claimed to be very efficient not only as a stopper for the sink, thus dispensing with the dishpan, but as a force pump to clear clogged drains. Suction power is obtained by means of a groove one-half inch wide around the edge of the under side. [Veribest Sales Co., 421 Pine street, San Francisco, California.]



LEWIS DOUBLE BALL-BEARING INK WELL.

The double ball-bearing feature in this ink well consists of a small corked float ball which rests upon a larger double-corked float enclosed in a cylinder of rubber with a removable top and circular opening. The ball rolls within its rubber casing, protecting the entering pen point by its lack of rigidity. The ink is forced to the top whenever the pen is dipped, supplying sufficient fluid so that no unnecessary time and effort are wasted in repeated dipping, and the construction is such that the top ball will not recede from the opening until the inkwell needs refilling. The square-shaped substantial glass frame has a removable top with an elastic band which clings and holds it in place. [W. E. Lewis, Corry, Pennsylvania.]



The Editor's Book Table.

EVAPORATING, CONDENSING AND COOLING APPARATUS. BY E. Hausbrand. Translated from the second, revised German edition by A. C. Wright, M.A., B.Sc. Second English Edition, Revised. Scott, Greenwood & Son, London, 1916. American distributors, D. Van Nostrand Co., New York City. [8 vo, 401 pages, 21 illustrations, 76 tables. Price, cloth, \$5 net.]

THIS authoritative work by the chief engineer of C. Heckmann, Berlin, and author of "Drying by Means of Air and Steam," is of exceptional value to engineers because of its table of coefficients giving positive answers to all questions ordinarily arising. Certain arithmetical and printer's errors of the former edition have been corrected and conversion diagrams have been appended by means of which the quantities in metric units may be readily converted into British units.

The treatise takes up transmission of heat, apparatus for heating with direct fire, injection of saturated steam, superheated steam, evaporation by hot liquids, transference of heat in general, evaporation in vacuum, evaporators of different types, diameter of pipes for steam, alcohol vapor, air and water, losses of heat by radiation, condensers, heating and cooling of liquids, air pumps, etc.

CHEMICAL DISCOVERY AND INVENTION IN THE TWENTIETH century. By Sir William A. Tilden, F.R.S., D.Sc., LL.D., Sc.D. George Routledge & Sons, Limited, London. E. P. Dutton & Co., New York City. [8vo, 487 pages, 150 illustrations, 11 portraits. Price, cloth, \$3.50 net.]

In this volume one of the most distinguished chemists of Great Britain and professor emeritus of chemistry in the Imperial College of Science and Technology, presents a thrilling account of the momentous conquests of matter by human knowledge during the past quarter century. The work is divided into four parts, the first being devoted to laboratories and laboratory apparatus for general teaching and special purposes. The second part deals with modern discoveries and theories, such as the disintegration and transmutation of elements, electrolysis, catalysis, architecture of molecules, etc. The third part treats modern applications of chemistry, including water and its purification, petrol, coal tar, dyes, essential oils, vegetable fiber and products from cellulose, explosives, fixation of atmospheric nitrogen, and rubber. The fourth part takes up progress in organic chemistry, particularly sugar, proteins, natural colors and enzymes.

The chapter on rubber reviews the principal sorts and sources with statistical production and trade data in quantity and value, both wild and cultivated. Plantation practice is sketched briefly; also the composition and constitution of rubber, rubber substitutes, the process of vulcanization, reclaiming, and concludes with a history of synthetic rubber. It is pointed out that the by-product, acetone, may become so profitable as to reduce the cost of butadiene rubber considerably, and so assist the synthetic in competition with the natural rubber. However, it is stated that the many difficulties yet to be overcome are such that rubber planters need entertain no alarm, particularly in view of the many new uses to which increased production might be put, especially if obtainable at reduced cost.

THE WORLD'S COTTON CROPS. BY JOHN A. TODD, B.L. A. & C. Black, Limited, London, England. The Macmillan Co., New York City. [8vo, cloth, 460 pages. Price \$4.25.]

At the present time, when the cotton trade stands in a critical condition as regards its raw material, and when so much pioneer development work is being done in connection with cotton growing, this volume will be especially welcome. It gives an account of the sources and varieties of raw cotton in non-technical language for the average grower and consumer, telling the former of the final destination and use of his crop and his rivals in other countries, and informing the latter of the conditions under which his raw material is produced and how to estimate future pros-

pects and determine the possibilities of new sources of supply. The author spent five years in Egypt and visited practically the whole of the American cotton belt and was born and brought up in close touch with the west of Scotland cotton industry, so that he has had exceptional opportunities to study his subject. Aside from general chapters on the cotton plant, geographical distribution of cotton, the uses of cotton and cottonseed, and the effects of the war, special chapters are devoted to the different cotton producing countries, including India, China, Japan and Indo-China; United States, Mexico, etc.; the price of American cotton; British West Africa; British East and Southeast Africa; other African colonies; South America; hand-staple American Upland; Egypt; Anglo-Egyptian Soudan; Sea Island cotton; Oceania, etc. Many excellent half-tones, maps, diagrams and a statistical appendix illustrate and supplement the text.

The disproportionate space allotted to Egypt is fully justified on the ground that Egypt is the world's chief example of cotton growing under irrigation, which, in the writer's opinion, is showing a tendency to become the prevailing method of cotton growing, which is now responsible for at least half of the world's crops, other than American, in Egypt, India, Russia, many parts of Africa, Peru, Arizona and California.

THE LAW APPLIED TO MOTOR VEHICLES. BY CHARLES J. BABBITT; Second Edition by Arthur W. Blakemore, West Publishing Co., St. Paul, Minnesota. [Large 8vo, 1,262 pages, buckram binding. Price, \$7.50.]

The universality of motor vehicles, for pleasure or business, makes the questions of law regarding them, the rights and privileges of their owners, their liability in cases of accident, and the many knotty legal points which have been decided upon matters of special interest. This volume, bound in the modern law library style, contains, under nearly 1,800 heads, the epitome of thousands of judicial decisions, so arranged that the special circumstances of each case are set down as the reasons for such decisions. An appendix gives the laws regarding right of way, laws of the road, street-traffic regulations, headlight laws, speed limitations, registration, fees, etc., of all the states. The first edition was by the late C. J. Babbitt. This second edition was prepared by Arthur W. Blakemore, of the Massachusetts bar, who has added many decisions which have been handed down in the interim. The work shows thorough, careful and conscientious study in its preparation.

THE TIRE RATE BOOK. THE CLASS JOURNAL CO., NEW YORK City. Published in January, May and September of every year. [16vo, paper, 196 pages. Price, 50 cents a year.]

This convenient handbook for tire manufacturers, dealers and garage offices gives the sizes and prices of the different motor car tires in all their models. It also contains the pneumatic and solid tire schedules for the different cars and trucks; a standard telegraphic code for ordering; motor world guide; commercial and pleasure vehicle tire sizes and rim data; comparisons of average American cars for eight years; dealers, garages, supply, repair and charging stations in the United States; metric sizes and their equivalents; types of rims and statistics showing that there is a car for every 29 persons in the United States.

NEW TRADE PUBLICATIONS.

MOTHER GOOSE has certainly been brought up to the twentieth century in "The Kant Slip Mother Goose," published by the Kelly-Springfield Tire Co., New York City. This is gotten up in the usual child's story book style and contains some modern adaptations of well-known nursery rhymes, all of which result in encomiums for the tires manufactured by that company. The book is printed in two colors, bound in boards,

and is sent out by the advertising department of the company to any address on receipt of the price, 20 cents.

The Davol Rubber Co., Providence, Rhode Island, has sent us a copy of a large, handsome card containing a tri-colored picture of the American flag and three striking sentences from President Wilson's address to Congress on April 2. A copy of this card was given to every employe of the company recently and undoubtedly ornaments many homes in and around Providence.

The Seneca Tripoli Co., St. Louis, Missouri, is distributing a neat little pamphlet entitled "Tripoli Products," which gives many interesting general facts regarding the nature and uses of tripoli earth, besides describing the many forms and varieties of products manufactured by the company. The booklet is illustrated with half-tones of the quarries, mills and warehouses, and gives special attention to the filtration qualities of its stones, and the uses of its various grades of flour, among which may be mentioned its value as a filler in rubber compounding.

The Cutler-Hammer Manufacturing Co., Milwaukee, Wisconsin, is sending out "Booklet E," a well-arranged and finely printed 32-page pamphlet describing the C-H control equipment for electric elevators. It covers the various classes of control, hand rope, car switch and push button systems for freight and passenger elevators. These various classes of equipment are fully illustrated by excellent half-tones, and much information is given regarding such accessories as limit switches, brakes, door safety switches, over-load protection devices, rules for motor rating, etc.

Two booklets, pocket size, of value to motorists, are "Rules of the Road" and "Common Causes of Tire Injury," which come from The B. F. Goodrich Co., Akron, Ohio. Both are well illustrated with cuts pertinent to the text, and much information is compressed into small compass. Every driver of a car will find these booklets practical and useful.

The customers of Pell & Dumont, 68 Broad street, New York City, dealer in crude rubber and gums, have received a serviceable binder for the daily market report sent out by this firm.

RUBBER TRADE INQUIRIES.

THE inquiries that follow have already been answered; nevertheless they are of interest not only in showing the needs of the trade, but because of the possibility that additional information may be furnished by those who read them. The editor is therefore glad to have those interested communicate with him.

[300.] Information is sought regarding the rubber trade in the Fiji Islands.

[301.] Names of manufacturers of small mills for laboratory use are requested.

[302.] A correspondent desires to purchase sponge rubber and sponge rubber scrap in large quantities.

[303.] A list of factories manufacturing or handling tube poles has been requested.

[304.] An inquiry has been received for rubber elastic cords for airplanes.

[305.] Names are requested of concerns manufacturing rubber bath mats with vacuum cups.

[306.] Information is sought concerning the preparation of rubber varnish.

[307.] A correspondent desires to be put in touch with makers of dieing-out machines.

[308.] An inquiry has been received for stock cutters.

[309.] The name of a concern equipped for treating cotton duck with black oil is requested.

TRADE OPPORTUNITIES FROM CONSULAR REPORTS.

A business man from Denmark, now in the United States, desires to represent in Russia American manufacturers and exporters of tires, druggists' sundries, and other articles. Report No. 24,585.

Quotations on rubber are desired by an applicant in France. Report No. 24,589.

A firm in Uruguay is in the market for rubber heels. Report No. 24,603.

A company in India wishes to be placed in touch with American manufacturers and exporters of rubber goods. Report No. 24,625.

An agency or representation is desired by a firm in Italy for the sale of suspenders and rubber goods. Report No. 24,626.

A firm in France wishes to purchase one pump, adjustable accumulator and press of 800 tons, with all tubes, manometer, etc., and all necessary machinery for the manufacture of solid rubber tires for automobile trucks. Report No. 24,634.

A business man in the Straits Settlements is in the market for machinery for manufacturing rubber sheeting, tubes, heels, soles, etc. Report No. 24,735.

An applicant in British East Africa is in the market for erasers. Report No. 24,696.

A firm in France would like to be placed in communication with American manufacturers and exporters of reclaimed rubber. Report No. 24,712.

An applicant in Norway desires to purchase 20 tons of rubber for fish tins. Report No. 24,721.

An agency for erasers, rubber bands, etc., is desired by a man in Norway. Report No. 24,724.

THE OBITUARY RECORD.

VERSED IN RUBBER CHEMISTRY.

THE INDIA RUBBER WORLD is informed of the death of Lyman M. Bourne, subsequent to an operation for goiter. Mr. Bourne was well known to rubber men, having been active in the

industry ever since his graduation from the Massachusetts Institute of Technology in 1903. His first position was as research assistant in the laboratory of the late Carl Otto Weber in Boston. On the death of Dr. Weber he entered the employ of the Revere Rubber Co., Chelsea, Massachusetts, as chief chemist and remained there until called to Brooklyn, New York, to assume the superintendency of the Eastern Reclaimed Rubber Co. In 1909 he went to The Good-year Tire & Rubber Co., Akron, Ohio, where he held the position of chief chemist and department manager for five years, resigning in 1914 to become general manager of the Double Fabric Tire Co., of Auburn, Indiana, and leaving there to become vice-president of the By-Products Realization Co., Chicago, Illinois.



LYMAN M. BOURNE.

signing in 1914 to become general manager of the Double Fabric Tire Co., of Auburn, Indiana, and leaving there to become vice-president of the By-Products Realization Co., Chicago, Illinois.

If course, if the latter claim is true, if that is the only reason that they did it, then the false statements are not of any real moment. If they did it for the other purpose, it may be of some moment. But, of course, if it is, even then it would not establish the plaintiff's main claim, but it would be a factor to be considered in connection with the other proof.

I think it is undisputed in the case that these defendants did not prescribe the main rules, or what I call the main rules. I mean the rules in regard to the necessity for the written guarantees of both the importer and manufacturer. I think it is admitted, or even if it is not admitted, I think it is undisputed, that these defendants did not prescribe those rules and regulations. Those were prescribed by the British authorities in London, as the uncontradicted proof in this case shows. So as to that part of it, at least, there can be no criticism of these defendants. As to how they may have attempted to enforce them, we will come to a little later. But as to the whole formation or creation and promulgation of these rules, I think the defendants had no part under the undisputed proof.

With the promulgation of these rules, the plaintiff claims that the defendants practically told the people that if they did not comply with the rules, they could not get import rubber. They did tell them that. I think the undisputed proof in the case bears out that statement, because the British authorities said that if they would not comply with these rules, you cannot get rubber, and therefore anybody who did not comply with these rules, would not get it.

You cannot predicate any charge against the defendants on that statement, because the statement that they made to that effect seems to have been required by the regulations of the British Government.

Then the plaintiff claims that these defendants falsely accused the plaintiff of a non-compliance with some of the regulations. I do not get clearly at all the point the plaintiff bases that claim on—that they falsely accused the plaintiff of non-compliance. As I get it, the claim of the plaintiff is that when he went in there, and there was some discussion about whether he had complied with these regulations, that he made his claim that he had complied with them as he understood them. That is how I understand the plaintiff's claim. I do not understand that he says that the defendants in any way accused him of violating the rules. I mean not at the time preliminary to this trial. But if there is any such claim, of course, you can consider it, because that is one of the charges that the plaintiff makes in his complaint upon which this cause of action arises.

The plaintiff also says that the defendants delayed putting through his shipments, and finally ultimately refused to pass any more. About that, there is no dispute that he could not get any more through. I say that perhaps rather unreservedly and unqualifiedly, notwithstanding Mr. Vorhis' testimony or demeanor, rather, that may have been a little uncertain about it. But I understand the defendants do not dispute really that they did not put any more of these things through. If there is any dispute about that, I will hear counsel, and he can take an exception. I do not intend to be unfair in the statement. I am only trying to simplify it and get it down to what I think there is really a dispute about. I do not understand that there is any real substantial dispute about the fact that the plaintiff could not get any more of his import rubber through, and that there was some delay. How much, I do not know. Whether it is important or not may not appear either; but that there was some delay in getting through his last three shipments, I think there is no dispute about. Whether it is important or not, I do not say.

The question on these last two considerations is this: Was the delay, whatever it amounted to, and was the final situation which now prevents the plaintiff from getting any import rubber from British domains, in any way due to the wrongful and unlawful acts of these defendants? I want to emphasize those two adjectives, "wrongful" and "unlawful," because it has to be acts of that kind and character, and you have got to find that there were acts of that kind and character before under any possibility this plaintiff is entitled to a verdict. To put it in another way: If these defendants in good faith, without any wrong motive, without any harmful intent or purpose, if they did something or said something or failed to do something which in any way had the effect of cutting off the plaintiff, even if they did that, there would be no liability, because the liability in this case is charged not upon an unintentional wrong, not upon something that happened which nobody sought to bring about; but it is charged upon a wilful, wrongful and unlawful attempt and undertaking to bring about the result that has been brought about. So you see that even if you find that these defendants had a certain fault I do not assume you will find that these defendants had a part in bringing about the final result, that would not entitle the plaintiff to a verdict unless you found that that part which the defendants took was taken wilfully, deliberately, with the intention of putting this plaintiff out of business, or crippling him in his business.

Just to illustrate what I mean by that let me say this. There is some proof here, in fact, I think it is undisputed in the proof, that the British representative, Mr. Broderick, who said he put

the final embargo on this—that is not the best word to use, because that is mixed with the Government embargo—but who put the final veto on the right of this plaintiff to get any more crude rubber—he said that he never knew of the plaintiff's connection with this rubber on this "Atlantic" except as he got the information of it from the defendants acting through Mr. Wilson. I want you to, if you will, bear in mind what I have just stated before, and see how that fact of itself should be applied. The information upon which Mr. Broderick acted, he said he got through Mr. Wilson. But that does not show that this plaintiff has any cause of action, because if Mr. Wilson went to Mr. Broderick at the request of Mr. Blitz, and told him, Mr. Broderick, what Mr. Blitz had asked him should be told, why, of course, you would see in a moment without even my saying it that then there could not be any basis for a liability against the defendants predicated upon that fact. To go further. If Mr. Wilson went to Mr. Broderick not merely to tell what Mr. Blitz had asked him to tell; but if he went there with no wrong motive, if he went there without any unlawful purpose, without any wrongful intention of hurting Mr. Blitz at all, and told what he knew about Blitz's connection with the rubber on the "Atlantic"; and even though that was the cause of Mr. Broderick cutting off Mr. Blitz's supply, still that would be no basis of a liability, because you will bear in mind that the acts of the defendants for which they can be held liable are only those which were done wrongfully and unlawfully. If they have acted rightfully and if they have acted with a good motive, there is no possible liability. On the other hand, if they have even acted thoughtlessly or carelessly or even inconsiderately, there is no liability so long as their lack of caution or lack of consideration was not due to any wrongful, wilful, intentional desire to harm this plaintiff.

I hope I have made that clear, because that is the gist of the case. The decision in the case rests upon your determination of whether or not there was any wrongful or unlawful acts on the part of these defendants that helped to bring about this result. Any other act of the defendants that was not wrongful or unlawful is not an act upon which you can find a verdict for the plaintiff, even though it may have been the cause of producing the very unfortunate situation that the plaintiff now finds himself in.

I have tried to clarify just what the real issues are in this case. If I have done so, I am glad, because that ought to be and is the object of the Court in charging the jury.

Just let me say to you a few other things, that you will not misunderstand either. There has been some talk in this case about nationality. I observed, when there was the first mention of that in this case, that that had nothing to do with the case. I am only saying it to you, because I believe it is my duty under the law to say it to you, that if any verdict should be found in this, or any other case, either for or against a plaintiff or for or against a defendant because of his nationality, why it would be a disastrous situation and a result that would bring discredit alike upon the jurors who found it and upon the county that they represented. Nationality has no part in our courts of justice. We are proud of the fact that people can come into our courts and get justice, no matter who they are.

While I have said that, let me say this: That if you feel that anybody in this case has attempted to import into the case any question of nationality, and if you feel perhaps a not unnatural resentment that that has been done, let me say to you very earnestly to be very careful to see that if you have such resentment that it does not operate against the party who you think may have attempted to import that question into the case. You see that is just as important to do as the other thing I have suggested is to do. Both are important, in order that you will get the right result, a result that is not influenced by resentment, or prejudice, or passion, or consideration, or sympathy, or anything else; but a result which is determined simply and solely by the truth of the case as you find it in the witnesses and in the exhibits, and that which rings true to your consciences.

The question of whether or not this plaintiff intended, in buying this rubber for Kulenkampff, that it should be exported or that it might not be exported, that of itself may not be a determining factor in the case one way or the other. It may have a bearing on the case, of course, depending upon how you view it, but it may not be a determining factor.

These defendants do not claim that they failed or refused to do anything for this plaintiff because of his connection with the Kulenkampff affair. They contend that they did all they could notwithstanding his connection with it, no matter what it may have been; and that in all they did they tried to keep him in good favor or get him back in good favor with the British Government, not as I understand it, because of any altruistic motive altogether either, not because they were interested in Blitz, as I understand it, but from a very practical and, in a sense, humanly selfish motive, as I understand it, that they did not want to take

the chance of their getting in trouble later, and that if they got in trouble perhaps the British Government would begin to curtail the supply. I am only stating what I understand is the defendants' claim. So the defendants claim that anything they did was not because of any action of the plaintiff in regard to the Kulenkampff affair. That is the reason why I say that the mere fact whether the Kulenkampff affair was an honorable one or a dubious one or a dishonorable one may not of itself help to determine this controversy. It has a bearing in the case, because everything must be considered that is in evidence on the intent of the parties. It has a bearing certainly, or it may have, upon what ultimately was the reason why Mr. Blitz did not get any more rubber through the British Consul. In so far as it has those bearings, it is important. But I do not think the case turns one way or the other upon how you decide that question. But that is the reason I am pointing it out to you.

In this case, like every case, the plaintiff has to prove his case. That means just this. It means that now that the case is all in, the evidence and the exhibits all before you, that you have to be convinced, that you have to be satisfied, that the truth of the case establishes the fact that the plaintiff claims, namely, that these defendants wrongfully and unlawfully conspired to do him this grievous harm. If you are convinced of that, then the plaintiff has proven his case. If you are not convinced of that, then the plaintiff has not proven his case. If he has not proved his case, under the law, the verdict must be for the defendants. In other words, the defendants do not have to disprove the plaintiff's claim. The plaintiff has to prove his claim. Failing to do that to your satisfaction he loses. To put it in another way. If you do not know whether or not these defendants wrongfully and unlawfully conspired to do this injury to the plaintiff, if you do not know whether it is so or not, then you must find for the defendants, because the plaintiff has not convinced you that it is so. He has to convince you that it is so before he can succeed. If you are satisfied that the defendants did not conspire, then the verdict is for the defendants, because the plaintiff has not shown you that they did conspire. It is only in the one event that you are satisfied as a matter of truth and fact that the plaintiff has proven and that the evidence shows that the defendants have wrongfully and unlawfully conspired to do this harm to this plaintiff, that you may find for the plaintiff.

There have been a number of interested witnesses in this case. Under the law the plaintiff is an interested witness. Each defendant is an interested witness. The plaintiff is interested because he is trying to get money. The defendants are interested because they are trying to defeat a claim of money sought to be obtained from them. So the law recognizes all of them as interested witnesses, and says merely this about them. The law does not say you must not believe them. A great many years ago they were not allowed to testify at all, because somebody apparently had the idea that interested people never told the truth. You are all business men, and you know that is not the fact always. You know that interested people sometimes do tell the truth, even though it hurts their interests. On the other hand, you know perfectly well that sometimes interested people do not tell the truth; that when it serves their purpose to exaggerate or color, or do even worse, they sometimes do it. The law recognizes all that, and says just this about interested witnesses, that you should take their testimony with care and caution and look at it carefully before you tie up to it. Before you are satisfied that you can rely on it, be sure that you believe it is true. If you do believe it is true, believe it, notwithstanding they have an interest. If you do not believe it is true, discard it. That, of course, you would do anyhow with other witnesses as well as those interested witnesses I have referred to.

The verdict in this case will be either for the plaintiff or for the defendants. If it is for the defendants, there is nothing more to the verdict and nothing more for you to deliberate upon. But if you find, under the rules I have given you, that the verdict should be for the plaintiff, then you will have to decide two other things. One is against which of the defendants the verdict should be; and the second what the amount of it should be.

Gentlemen, I really feel almost embarrassed in stating some things here to you, because you are so intelligent, but I feel it is my duty to say this. You will understand the fact that I am going to charge you about the question of damages does not indicate that I think you will ever get to that question at all. I have to charge you about it, because under the law I have to cover every possible question in the case before you retire. I cannot tell whether you are going to find for the plaintiff or for the defendants. So do not be misled by the fact that I am going to charge on the question of damages. You will not get to the question of damages if you find for the defendants. But if you find for the plaintiff, then you come to the question of damages, and the determination of which of the defendants your verdict should be against.

On the latter question this is the law: If there is a conspiracy, as I have already told you, there must be at least two to take part in it, and there may be more. The plaintiff claims that all these defendants who have been named here conspired together, that they were all of this committee, and whatever was done by one was done by all; that the circulars that went out bore the names of all—perhaps not every one, but most of them did at any rate; and that they were acting in concert and acting through their chairman, and that their secretary, Vorhis, was acting in behalf of them all and representing them all.

If you find that there was any conspiracy, and that they all participated in it, and that it was a conspiracy of the kind I have indicated to you, an unlawful, wrongful combination to squeeze this plaintiff, then your verdict may be against all of them. If you find any one or more of them did not enter into that conspiracy, your verdict could only be against those whom you think did enter into it.

There does not have to be direct proof of conspiracy. I suppose it is almost impossible in any law suit to get the concrete proof that two or more people got together and said, "We are going to conspire to do this thing." It is not done that way, as a rule, at least. The law recognizes that fact, and says that you may (I do not say that you will or should) in proper cases find that there was a conspiracy from the acts and from the things that you might prove to have been done to you from the concert if there be such between the parties. So if you find a verdict for the plaintiff, and get to that question, just say whether or not in your verdict it is against all the defendants, or if not name those against whom you find.

Then on the question of damages the law is very simply stated. If the plaintiff is entitled to recover, he is entitled to recover whatever damages he sustained as the result of these wrongful and unlawful acts of the defendants, because you have got to find that they were wrongful and unlawful before you find for the plaintiff at all. If they did these wrongful and unlawful things, they must pay the plaintiff for the damage that resulted. That you will fix, using not necessarily as the mathematical basis of your verdict the proof as to what his earnings have been before and since, but using that proof together with any other proof there may be in the case in determining what really has been the damage occasioned to him by these acts of these defendants.

PERLMAN-FIRESTONE SUIT DISMISSED.

AFTER five days of legal skirmishing before Judge Learned Hand in the United States District Court of New York the infringement suit of the Perlman Rim Corporation, of New York City, against the Firestone Tire & Rubber Co., Akron, Ohio, was brought to a dramatic close through its sudden withdrawal by the attorneys for the rim corporation, and its final dismissal without prejudice to either side by the Court. This was followed later by the announcement of L. H. Perlman's removal from the presidency of the company bearing his name because of his complete lapse of memory while on the stand regarding his London business career of 1895, and his refusal to answer questions or to affirm or deny allegations reflecting upon his integrity.

Although this surprising denouement constituted a signal victory for the Firestone Company, the Perlman patent continues technically a valid grant. However, the significance of the present situation lies in the fact that the historic suit against the Standard Welding Co., authenticating the Perlman patent, was won principally because of the Court's belief in Mr. Perlman's rectitude and veracity, and the acceptance of his testimony, supported by witnesses, as to the manner and date of the mental conception of his invention. Should the validity of the patent again be tested at law it is an open question what weight his testimony would carry.

According to "Automobile Topics," "it is believed that Perlman's unexpected elimination from the Perlman company will render it possible for those in control of its affairs to readjust relations with the trade, thereby aiding in bringing to an end the tense uncertainty that has remained ever since the rim industry was held up by the now historic decision by the old Standard Welding Co."

It was in February, 1916, that the Perlman patent was sustained in a suit against the Standard Welding Co. Up to that time anyone had made demountable rims without restrictions, the Firestone company, for instance, having been making them since 1908. The Perlman patent, not issued until 1913, was made operative by Perlman swearing that his invention dated back to 1903.

Thus Perlman had a practical monopoly on all forms of demountable rims. The factory of the Standard Welding Co. was closed and all rim manufacturers notified to discontinue making rims. Then the Perlman Rim Corporation was organized with a capital of \$10,000,000, and it was understood that Perlman received between \$3,000,000 and \$4,000,000 for his invention.

The entire automobile industry was disturbed and its output seriously threatened. Automobile manufacturers who had been receiving their rims from the Standard Welding Co. made arrangements with the Perlman Rim Corporation to release a sufficient number to maintain their deliveries, and most of the other rim manufacturers submitted and turned their plants over to the Perlman Rim Corporation.

Being firmly convinced that this patent was unjust and a serious menace to the entire motoring public, H. S. Firestone refused to recognize the Perlman claims in any way. Braving an injunction against his firm and the closing of his rim plant, he decided to fight the matter out in the courts and took personal charge of the case for his company. The injunction was first argued in New York before Judge Mayer on April 13 last. By that time the Firestone attorneys had gathered new evidence showing the character of the testimony on which the decision in the former suit had been obtained and asked that they be given an opportunity to present the facts in open court. On this showing, an injunction was denied and the present suit was set for a hearing.

The Firestone company is still manufacturing rims untrammelled by any patent claims, and Mr. Firestone believes everybody is now put on an equal footing again where merit and efficiency are the measures by which all will be judged.

JUDICIAL DECISIONS.

ROUTES FOR RUBBER SHIPMENTS.

AN important decision was rendered in the Court of Appeals London, in a rubber contract case regarding routes for rubber shipments.

L. Sutro & Co., London, England, bought a quantity of rubber under a contract (c. i. f.) from Heilbut, Symons & Co., London, England. The sellers had the goods shipped to Seattle, whence they were to be reshipped by rail to their destination, New York City. To this the buyers objected and demanded arbitration to settle the matter. When their objection was overruled, they appealed to the Committee of the Rubber Trade Association and by a second decision in a special case, it was held that the buyers were not liable to accept delivery. From this decision the sellers now appealed, claiming that the route by which they had sent the rubber had become a usual one, that it could be read into the contract and that they, therefore, had the right to use it instead of the route wholly by sea.

It was held, however, that the terms of the contract, referring constantly to "vessel or vessels" and to "the port of discharge," provided for carriage by sea only, and that consequently, although it had become the custom to ship goods from the East to Seattle and then transmit them by rail to New York City, the terms of the contract could not be construed to include this custom. The appeal by the sellers was, therefore, dismissed with costs.

DELASKEI & THROPP CIRCULAR WOVEN TIRE CO. v. EMPIRE RUBBER & TIRE CO., in District Court, New Jersey, December 12-16. In a suit for infringement by the manufacture and sale of

infringing machines, an interlocutory decree was entered in favor of complainant, but limiting the accounting and extent of complainant's recovery to the profits which defendant had derived from the infringement. On affirmance of such decree the parties made a settlement and entered into a stipulation that the amount paid by defendant was accepted by complainant in full payment of all claims and demands which it may have against the defendant by reason of the defendant's infringement.

Held, that the settlement covered only infringements of the character charged in the bill and such damages and profits as could have been recovered under the issues in the cause and that it did not bar a subsequent suit by complainant against a user of machines sold by defendant although bought before it was made. [Federal Reporter, Vol. 239, page 139.]

FOLEY v. HOME RUBBER CO. New Jersey Supreme Court. A sales representative of a manufacturing company who became one of the Lusitania victims, while on his way to Europe on business for his company, must be regarded as having lost his life in an accident in the course of his employment, within the provisions of the New Jersey workmen's compensation act, entitling his widow to an award under that law. [Atlantic Reporter, Vol. 99, page 624.]

WENDELL v. AMERICAN LAUNDRY MACHINERY CO., United States District Court, Eastern District of Pennsylvania. Public use of a machine with permission of the inventor for two years before his application for a patent conclusively establishes his abandonment of any right to a patent, unless it appears that such use was for experimental purposes only. [Federal Reporter, Vol. 239, page 555.]

INTERESTING LETTERS FROM OUR READERS.

SINGAPORE CELEBRATES AMERICAN WAR PARTICIPATION.

To the Editor of THE INDIA RUBBER WORLD:

DEAR SIR—The weekly rubber auction was suspended for an hour yesterday to enable those present to attend the Anglo-American war participation services which were quite impressive, the address being delivered by an American Episcopal archdeacon, as per enclosed clipping and two postcards, showing St. Andrew's Cathedral and statue of Sir Stamford Raffles, the founder of Singapore.

Singapore, April 27, 1917.

RICHARD WEIL.

DO RUBBER SOLES AND HEELS PROTECT ARTILLERYMEN?

To the Editor of THE INDIA RUBBER WORLD:

DEAR SIR.—In the "Red Cross Magazine" for July, page 249, G. F. Keogh, an ambulance man with the Red Cross in France, describes how heavy artillery gunners use plugs of cotton in their ears and rise on their toes during the firing to prevent rupture of the ear drums.

Can you advise a reader of THE INDIA RUBBER WORLD to what extent, if any, a good rubber heel and sole will prevent or ease the concussion?

CHAS. P. FOX.

Cleveland, Ohio, June 20, 1917.

AKRON-BOSTON EXPRESS.

The present railroad congestion has greatly increased the transportation of freight by motor trucks for distances up to 75 miles or more. A route covering a distance of 1,540 miles, maintaining regular schedules night and day, is therefore an interesting development of motor truck possibilities. The Goodyear Tire & Rubber Co. has inaugurated this new service by the establishment of a line operating between its factory at Akron, Ohio, and Boston, Massachusetts, hauling tires to its eastern branches, and returning laden with cotton fabric from the Goodyear Cotton Mills, at Goodyear, Connecticut. Several round trips have already been made, the last of which was accomplished in seven and one-half days.

The Rubber Association of America.

Usefulness. The beneficial influence of this organization on present trade conditions is noteworthy. New divisions are being formed and the membership roll is constantly increasing.

At a meeting of the Executive Committee held May 31, 1917, the Association transacted the following business: members were elected:

FIRM MEMBERS

ALCOHOLIC RUBBER CO., New York City; J. Pines, Pines Rubber Co., Inc., Brooklyn, New York; S. L. Warner, The National Tire & Rubber Co., East Palestine, Ohio; J. A. Duval, F. S. Carr Co., Framingham, Massachusetts.

TRANSFER FROM ASSOCIATE TO FIRM MEMBERSHIP

F. L. McGreen, Standard Underground Cable Co., Pittsburgh, Pennsylvania; O. A. Barnard, The O. A. Barnard Co., Inc., New York City.

RUBBER RECLAIMERS' DIVISION

The Rubber Reclaimers Division has succeeded the Rubber Reclaimers Club, founded by William T. Rodenbach, March 28, 1900, and promises to be one of the most active divisions of the Association. A mid-summer meeting will be held July 24, at the Copley Plaza, Boston, Massachusetts, followed by a shore dinner at the Point Shirley Club, Winthrop, Massachusetts.

An important meeting was held June 12 and resulted in the adoption of the following standard specifications relating to rubber scrap, effected July 1, 1917.

STANDARDS OF SCRAP RUBBER SPECIFICATIONS AND PACKING

All goods bought or sold under the following specifications are understood to consist only of Domestic or Canadian manufacture, unless otherwise stipulated. All grades of scrap rubber shall be bought and paid for net weight, mill weights to govern, and no allowance for bagging or covering of any kind shall be made, nor shall the same be returned to the seller.

All shipments of scrap rubber must be contained in bags, bales, bundles, or other suitable containers, and if shipped loose a charge of ¼ cent per pound shall be made for extra handling, except automobile tires and railroad hose which may be shipped loose.

DELIVERY

A. All goods, when 2000 pounds, unless otherwise specified, in bulk or in large sacks, shall mean 1900 pounds. Small quantities of goods shall be accepted at 10 per cent reduction.

B. Should any dispute arise between buyer and seller as to the proper standard and the seller claim that they are a proper delivery the matter shall be referred to the Arbitration Committee of The Rubber Association of America, Inc., who shall appoint a referee of whom either party may demand, and whose decision shall be final.

C.—All scrap rubber of foreign manufacture shall be bought C.I.F. port of entry as per weight determined by sworn weigher's certificate, seller to be responsible for packing, and shall be subject to inspection and govern purchases of domestic manufacture.

D.—REJECTIONS: Upon his request all rejections shall be returnable to the seller within thirty days from the time notice of rejection is received by him and upon payment by him of ½ cent per pound to cover cost of sorting and rebaling. If shipping instructions are not furnished within the above mentioned thirty days the purchaser shall be at liberty to make such disposition of the material as he may see fit. The above does not apply if rejected material is purchased by the mill.

E.—Each grade of scrap rubber must be packed separately, and if not so packed a handling charge of ½ cent per pound shall be made by the buyer.

F.—All scrap rubber must be dry and free from dirt. All scrap received wet may be dried by the buyer, such shipments to be paid for on the dry weight as ascertained at the mill.

G.—A purchase contract shall not be considered filled until the full quantity within 2½ per cent more or less net weight shall have been received, any rejections to be replaced within thirty days of the date of notice of rejection to the shipper.

H.—If through embargo a delivery cannot be made at the time specified the contract shall remain valid and shall be completed immediately on the lifting of the embargo, and terms of said contract shall not be changed. Notice of embargo must be served by seller.

Code words appear in italics.

1. RUBBER BOOTS AND SHOES (*Acres*). The deliveries of rubber boots and shoes must consist of rubber boots and shoes of domestic or Canadian manufacture. Red, white, tan, and fancy colored shoes are not a good delivery. They must be dry and free from dirt. All cloth top shoes, trimmed or untrimmed, and soles or heels of rubber boots and shoes from which the uppers have been removed shall not be accepted as a good delivery.

TRIMMED ARCTICS (*Acres*). Must be closely trimmed and free from leather or any composite non-rubber bearing material such as fiber inner soles, etc.

(a) UNTRIMMED ARCTICS. Must be free from leather or any composite non-rubber bearing material such as fiber inner soles, etc.

3. TRIMMED TENNIS SHOES (*Clam*). Must be black; closely trimmed; free from molded soles and leather, or any composite non-rubber bearing material such as fiber inner soles, etc.

4. UNTRIMMED TENNIS SHOES. Must be free from leather and molded soles, or any composite non-rubber bearing material such as fiber inner soles, etc.

4. STANDARD AUTO TIRES (*Dirk*). Must be free from the following: All unguaranteed tires; heavy beaded tires; non-pneumatic or filled tires. Must not contain any hard, oxidized, burnt, single tube, motor cycle, stripped or badly worn tires nor tires containing leather or metal.

5. UNGUARANTEED TIRES (*Earl*). Must be free from heavy beaded tires, hard or oxidized, stripped, badly worn tires with leather and metal.

6. HEAVY BEADED TIRES (*Farm*). Must be free from hard or oxidized tires, stripped, badly worn and tires with leather and metal.

7. BADLY WORN TIRES (*Game*). Must be free from hard or oxidized tires, heavy beaded and tires with leather and metal. A reasonable proportion of the tread must be on the tires.

(a) STRIPPED TIRES. Must be free from hard or oxidized tires, heavy beaded and tires with leather and iron.

8. NO. 1. AUTO TIRE PEELINGS (*Hawk*). Must be free from cloth, metal and leather.

9. NO. 2. AUTO TIRE PEELINGS (*Iced*). Must consist of peelings from auto tire treads only and must be free from metal, leather and stripped auto tire fabric.

10. BICYCLE TIRES (*Jade*). Must be free from hard or oxidized tires, wire and beaded tires.

11. SOLID WAGON AND CAB TIRES (*Kite*). Must be free from metal and baby carriage tires.

12. SOLID MOTOR TRUCK TIRES (*Lamp*). Tires must be over 2½ inches in diameter. Must be free from metal and tires with hard bases, fiber bases and cloth bases.

13. AIRBRAKE HOSE (*Mask*). Must be free from metal, hard or oxidized hose and steam hose.

14. GARDEN HOSE (*Nail*). Must be ½ inch, or over in diameter and free from metal, rags, rope and cotton covered hose.

15. LARGE HOSE (*Oven*). Large hose must be one inch or over in diameter. Must be free from metal, rags, rope, hard or oxidized hose and all cotton covered hose.

16. COTTON COVERED FIRE HOSE (*Park*). Must be rubber lined, and free from hard or oxidized hose, double jacketed and extra heavy single jacketed hose, and metal.

17. NO. 1. AUTO INNER TUBES (*Quiz*). Must be strictly elastic floating tubes, free from crusty tubes, cloth, metal, patches and valve seats.

18. NO. 2. AUTO INNER TUBES (*Race*). (Known as Compounded Tubes.) Must be standard tubes, free from crusty tubes, cloth and metal.

19. NO. 1. BICYCLE INNER TUBES (*Salt*). Must be strictly elastic floating tubes, free from crusty tubes, cloth, metal and valve seats.

20. NO. 2. BICYCLE INNER TUBES (*Train*). (Known as Compounded Inner Tubes.) Must be standard tubes, free from crusty tubes, cloth and metal.

21. RED AUTO INNER TUBES (*Utes*). Must be standard tubes, free from punchings, crusty tubes, cloth, metal and black patches.

(a) WHITE AUTO INNER TUBES. Must be standard tubes, free from crusty tubes, cloth, hard metal, and patches other than white.

(b) WHITE BICYCLE INNER TUBES. Must be standard tubes, free from crusty tubes, cloth, hard metal, and patches other than white.

22. NO. 1. WHITE RUBBER (*Fuse*). Must consist of strictly clean white soft druggists' sundries and must be free from cloth and metal.

23. NO. 2. WHITE RUBBER (*Hard*). Must consist of white horse shoe pads, white toys, white mechanical goods, and to be free from cloth, metal, crusty, hard or oxidized material.

24. NO. 3. WHITE RUBBER (*Hare*). Must consist of painted white rubber balls or toys from which the paint has been removed, and to be free from cloth, painted wainscoting, metal and hard or oxidized rubber.

NO. 4. WHITE RUBBER. Must consist of white jar rings and be free from cloth, metal and hard or oxidized rubber.

25. WHITE WRINGER RUBBER (*Wren*). Must be strictly white soft rubber, free from yellow wringer rubber, hard or oxidized wringer rubber, cloth and metal.

26. YELLOW WRINGER RUBBER (*Xray*). Must be free from cloth, metal and hard rubber.

27. MIXED BLACK RUBBER (*Yoke*). Must be free from cloth, metal, crusty, hard or oxidized material, packing, stripped matting, tiling, baby carriage tires and molded soles.

28. MATTING AND PACKING (*Zero*). Must be free from Garlock, Crandall, and piston packing, belting and similar material, metal and hard or oxidized stock.

29. NO. 1. RED RUBBER (*Yeast*). Must consist of soft red druggists' sundries, free from maroon, chocolate, and other dark shades, also free from cloth and metal.

30. NO. 2. RED RUBBER (*Yea*). Must consist of material such as red toys, balls, mechanical red. Must be free from jar rings, soles, packing, and oxidized rubber, cloth and metal.

31. RED PACKING (*Yea*). Must be free from hard or oxidized rubber, ball and metal and oxidized rubber.

UNITED STATES RUBBER CO. MAKES ARTIFICIAL LEATHER GOODS.

Artificial leather is a new development of the rubber business and is being much used for high-grade automobile-topping and in imitation of leather articles of all kinds, such as traveling bags, furniture upholstery, and similar articles. The United States Rubber Co. is now manufacturing and placing traveling bags on the market, but has thus far been unable to meet the demand and is planning to enlarge this department.

At the Naugatuck, Connecticut, plant of the Goodyear's Metallic Rubber Shoe Co. a new rubber fabrics department has been started in the "Old Shop" on Rubber avenue. The present capacity of the auto-topping department is 5,000 yards a day, but this will shortly be doubled and the output will, eventually, be 20,000 yards per day.

In conjunction with this department, it is planned to have the rubberized carriage cloth and artificial leather plant, which is now operated in Malden, Massachusetts, moved to Naugatuck, where it will be developed until it has a capacity of 10,000 yards a day.

It is expected that the new rubber fabrics department will require from 150 to 200 operatives in the near future. It will be under the management of James W. Quirk, who has had extensive experience at the National India Rubber Co., Bristol, Rhode Island; the Canadian Consolidated Rubber Co., Limited, Montreal, and the Boston Rubber Shoe Co., Boston, Massachusetts.

RUBBER MEN DISCUSS EXPORT TRADE.

IN connection with the industrial trade exposition held June 23 to 30, at Springfield, Massachusetts, an export conference was instituted as a prominent feature, and this brought together many men now exporting, and others who are considering the broadening of their business, by securing foreign trade. On the opening day, Edwin F. Sweet, assistant secretary of the Department of Commerce, was the principal speaker. The conferences from Monday to Saturday were confined to special subjects, or lines of merchandise, and on each day a number of leading men in the chosen industries addressed the meetings. Wednesday, June 27, was denominated "Leather and Rubber Goods Day," and the rubber industry was represented by E. H. Huxley, president of the United States Rubber Export Co., Limited, New York City, and J. B. Maus, export manager of The Fisk Rubber Co., Chicopee Falls, Massachusetts.

PRACTICAL ADVANTAGES OF AN EXPORT BUSINESS.

Mr. Huxley delivered a carefully prepared address, showing the advantages of an export business to American manufacturers. Such business, he declared, because of its stability, offers a balance which becomes invaluable in times of domestic business depression. Foreign business is permanent and secure. Unlike the domestic buyer, the foreign customer is largely dependent on the seller, and if his goods are properly made, shipped promptly and exactly as specified, he will conceive a loyalty and trust in the seller hard to overcome.

Contrary to general belief, Mr. Huxley declared that records prove that the ratio of selling expense is considerably below that for a like amount of domestic business, the reasons being that calls by salesmen are less frequent and orders

average larger. Another advantage is that this business is for cash, either before or coincident with the shipment of the goods.

To properly conduct an export business, one man at least must know export, think export, sympathize with export and

realize what it means. There are three ways for the smaller concerns to build up an export business: (1) Utilize export commission houses in this country; (2) send a representative to make one trip and appoint local agents, or (3) cooperate with other houses in non-competing lines and maintain a joint organization. Of these, he considered the last the least desirable; the second the most so. Mr. Huxley discussed the price question, the matter of credits, and advised a careful and intelligent handling of these subjects. He told those of his hearers who have added an export business to consider it as a fixture, and on no account let anything interfere with it, whatever may be domestic trade conditions. He said:

We are bound sooner or later to be forced into foreign trade in spite of ourselves, and being so forced, it is the wise man who recognizes the advantages to be obtained, who realizes the benefits that must come to his domestic business, and who carefully, slowly and intelligently develops part of his business in foreign fields.

RUBBER GOODS IN OVERSEAS TRADE.

John B. Maus, export manager of The Fisk Rubber Co., Chicopee Falls, Massachusetts, told of the growing importance of the rubber industry, gave some account of the production and uses of this material, and to this added some statistics. Touching upon its rapidly increasing use on account of the war, he spoke of the opportunities of American rubber manufacturers to place their products in foreign countries. To properly do this, he told his hearers they must know geography, the customs of the people, the shipping facilities, the railway, highway and other developments to determine the possible markets, and he described some of the more important ones. The importance of properly protecting trade-marks, the necessity of using the native tongue of the country in all correspondence, catalogs and advertising matter, and the probability of being obliged to give long term credit were touched upon, and the great advance in banking facilities described. Mr. Maus recommended a broad system of commercial education of young men. In conclusion he said:



JOHN B. MAUS

The business world to-day is vitally interested in this problem, for no organization can succeed in a material degree whose workers are not efficient. The foundation of national prosperity clearly rests upon that result accomplished by its people to serve real purposes in sympathy with current industry, science and government. If we can encourage early, direct business training, the usefulness of the populace of our country will assure both trading power and wealth. Now is the time to make arrangements for after-war business, by a high standard of quality, an intelligent representation, and sufficient encouragement by the financial interest to permit a worldwide business.

A GERMAN CRUDE RUBBER RUSE THAT FAILED.

Some curious documents occasionally reach the British Prize Court. One letter from a Hamburg firm to branches in Japan, recently intercepted, discloses a subtle attempt to get much needed rubber and copper through the British blockade into Germany. The veiled instructions follow:

"We request you to inform us if you will be able to supply us with large quantities of very heavy copper and bronze vases, also animals. You can send us the roughest and most faulty examples. The animals must be massive, not hollow, and must have the appearance of curiosities. If you can ship 10 to 20 tons per month direct to Sweden as curiosities * * * we shall be glad if you could arrange to pack the cases with raw rubber so that the works of art should not suffer."

This is another example of the importance of rubber in war times and reflects the extreme measures adopted by the Germans to secure even the smallest supplies of this necessary material.



EDWARD H. HUXLEY.

News of the American Rubber Trade.

MEETING OF THE EAGLE-PICHER LEAD CO.

THE Eagle-Picher Lead Co. held the annual summer meeting of its Eastern sales force in New York City, from June 19 to 21. The business sessions were held at the new New York offices at 101 Park avenue. Besides the sales force, there were present O. S. Picher, president; R. W. Evans, assistant general sales manager; John R. MacGregor, assistant general sales manager, and John B. Livingston, all from Chicago; Mr. Chatam, manager of the Pittsburgh branch; also Dr. Schaeffer, chief chemist of the company; W. E. Maston, manager of the Philadelphia branch, and M. H. Riley, manager of the Baltimore branch. The company's new plant at Newark, New Jersey, was visited, and the social activities included a banquet at the Gate Des Beaux-Arts, presided over by President Picher.

This was one of the most successful meetings this organization has held and those in attendance numbered about thirty.

SUBSIDIARIES ELECT PRACTICALLY IDENTICAL OFFICERS.

The two leading subsidiaries of the United States Rubber Co., at Naugatuck, Connecticut, have recently elected directors and officers. The directors of Goodyear's Metallic Rubber Shoe Co. are Walter S. Ballou, James B. Ford, Samuel Norris, W. T. Rodenbach and F. F. Schaffer. The officers are F. F. Schaffer, president; W. T. Rodenbach, treasurer; Charles T. McCarthy, secretary; Homer E. Sawyer, general manager; John D. Carberry, assistant secretary; and Charles S. Myers, assistant treasurer.

The directors of Goodyear's India Rubber Glove Manufacturing Co. are Walter S. Ballou, John D. Carberry, Ernest Hopkinson, W. T. Rodenbach and F. F. Schaffer. The officers of the company are identical with those of the first mentioned company, with the exception of the assistant treasurer, which office in the latter company is held by C. C. Schofield.

RUBBER COMPANY DIVIDENDS

The Apsley Rubber Co. has declared its regular semi-annual dividend of $3\frac{1}{2}$ per cent on preferred stock, payable July 1 to stockholders of record June 30.

A quarterly dividend of \$1.75 per share has been declared on both the common and preferred stock of The Barrett Co., payable July 2 to stockholders of record June 20.

The General Electric Co. has declared a stock dividend of \$2 per share, payable July 14 to stockholders of record June 16.

The Goodyear Tire & Rubber Co. paid a quarterly dividend of 3 per cent on common stock on June 1.

The Kelly-Springfield Co. has declared a quarterly dividend of \$1.50 per share on 6 per cent preferred stock, payable July 2 to stockholders of record June 18.

The board of directors of the Keystone Tire & Rubber Co. has declared a quarterly dividend of 2 per cent with an additional $\frac{1}{3}$ per cent on preferred stock and a regular quarterly dividend of 3 per cent on common stock, payable July 2 to stockholders of record June 22.

The Pennsylvania Rubber Co. has declared regular quarterly dividends of $\frac{1}{4}$ per cent on preferred and $1\frac{1}{2}$ per cent on common stock, payable June 30 to stockholders of record June 15.

The Westinghouse Electric & Manufacturing Co. has declared a quarterly dividend of $\frac{1}{4}$ per cent on preferred stock, payable July 16, and of $\frac{1}{4}$ per cent on common stock, payable July 31, both dividends payable to stockholders of record June 30.

DE LISSER SUBMITS A WAR TAXATION PLAN.

Of the many forms of war taxation proposed during the past few weeks, none is simpler than that submitted by Horace DeLisser, chairman of the board of directors of the Ajax Rubber Co., to Chairman Simmons, of the finance committee of the Senate. The plan is to impose a universal levy of one-half of one per cent of the gross annual sales made by every business in the country. Such a tax, it is claimed, would net the government the required \$1,000,000,000, at the same time proving equitable, economical, easy to collect and in no wise disturbing to trade. Distributed to every article of merchandise sold throughout the United States, as well as covering lawyers' fees and other professional emoluments, it would offer little incentive for evasion.

BANQUET TO JESSE E. LA DOW.

Nearly one hundred persons attended the banquet tendered Secretary Jesse E. LaDow, of the Mansfield Tire & Rubber Co., Mansfield, Ohio, on his return from an extended tour to the Far East. In the unavoidable absence of the president, C. R. Grant, G. W. Henne, vice-president and general manager, acted as toastmaster. Besides the officers of the company, the directors, sales managers, heads of departments and their assistants there were invited guests including the mayor of Mansfield, and a number of leading local bankers and professional men. Several eloquent addresses were delivered, interspersed were songs and recitations. Mr. LaDow concluded the evening's entertainment with an interesting talk of great educational value on his trip and the details of his research in the plantations of the Far East. The affair was a most enjoyable one and much credit for its success is due to the committee: R. H. Sotherland, purchasing agent; P. H. Ober, general superintendent; H. W. Webster, sales manager, and A. C. Moore, assistant secretary.

RUBBER COMPANY SHARE QUOTATIONS.

The following market quotations of shares of rubber manufacturing companies on June 25 are furnished by John Burnham & Co., 115 Broadway, New York City, and 41 South La Salle street, Chicago, Illinois.

	Bid.	Asked.
Ajax Rubber Co. (new)	68 $\frac{1}{2}$	71
Firestone Tire & Rubber Co., common	115	122
Firestone Tire & Rubber Co., preferred	105	107
The B. F. Goodrich Co., common	51 $\frac{1}{2}$	52 $\frac{1}{2}$
The B. F. Goodrich Co., preferred	105 $\frac{1}{2}$	108 $\frac{1}{2}$
Goodyear Tire & Rubber Co., common	180	185
Goodyear Tire & Rubber Co., preferred	105	107
Kelly-Springfield Tire Co., common	47 $\frac{1}{2}$	48 $\frac{3}{4}$
Kelly-Springfield Tire Co., preferred	89	95
Miller Rubber Co., common	180	190
Miller Rubber Co., preferred	102	105
Portage Rubber Co.	145	155
Rubber Goods Manufacturing Co., preferred	65	70
Swinehart Tire & Rubber Co.	61	61 $\frac{1}{2}$
United States Rubber Co., common	107	107 $\frac{3}{4}$
United States Rubber Co., preferred		

CONSOLIDATION OF WESTINGHOUSE INTERESTS.

An important development in the affairs of the Westinghouse organizations, here and abroad, is the consolidation of the British, French and Italian Westinghouse companies. The powerful financial group in control is reported to have further plans for extension of interests, by which it will rival the great German company, the *Allgemeine Electricitats Gesellschaft*. The American Westinghouse company not only retains a financial interest in this combination, but an agreement of alliance has been made with the London group under which the American company trades in the Western Hemisphere and the Far East, including Asiatic Russia, and the British company in Europe, Africa and Australia, each company representing the other as sole agent in its respective territory for business that naturally gravitates toward the other.

TRADE NOTES.

To meet the demands of constantly increasing business the New York Rubber Co., New York City, has increased its capital stock from \$300,000 to \$500,000.

Gaston, Williams & Wigmore, Inc., New York City, have removed their offices from the Guaranty Trust Building to the Equitable Building, 120 Broadway.

The recently issued annual report of the Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pennsylvania, shows a surplus of nearly double that of the year before. During the 12 months ending last March the company did a gross business of \$89,539,442, on which it realized a net manufacturing profit of \$17,461,690. Over a million dollars of miscellaneous income, including interest, dividends and royalties, brought the profit up to the \$18,000,000 mark.

The New Jersey Testing Laboratories, Montclair, New Jersey, have recently completed extensive additions to their offices and laboratories, the latter now occupying three buildings and being equipped to handle a large amount of research work, carrying tests to the semi-commercial stage, if desired.

The New York City offices of the General Electric Co. have been removed from 30 Church street to 120 Broadway, in the Equitable Building.

The L. Candee & Co., New Haven, Connecticut, has purchased the property of the Connecticut Pie Co. adjoining its plant and also the property belonging to the Yale Brewing Co. No definite plans have yet been formulated with reference to the use of these real estate acquisitions.

After July 1 the Oak Rubber Co., formerly operating in Akron, will be located in Ravenna, Ohio, this change being necessary to secure satisfactory quarters for the increased production of toy balloons, the company's exclusive product. Two and one-half acres located on North Chestnut street on the Erie Railroad, have been secured, and a factory will soon be built on this property.

Formal transfer was made of the Adams & Ford Co. property at Cleveland, Ohio, to the United States Rubber Co., New York City, on June 1. The Adams & Ford Co. is one of the oldest and largest distributors of rubber footwear in the Middle West and is the owner of the "Everstick" rubber.

The Kemp Rubber Co., Buffalo, New York, has moved to 246 Washington street. This concern, which has been operating for 20 years, carries a general line of rubber merchandise.

The Gillette Rubber Co., Eau Claire, Wisconsin, has commenced operation.

It is reported that the Dowse Rubber Co., recently incorporated, plans to take over an already equipped plant in Chicago, Illinois, and that the product of the company will be stamped "Dowse-Durability."

POLACK TYRE & RUBBER CO. APPOINTMENTS.

G. H. Miller has been appointed manager of sales and advertising for the Polack company, with headquarters at the New York City office.

William Domnich has been made representative of the company at Pittsburgh, Pennsylvania.

H. J. Kenney is manager of the branch at New Haven, Connecticut.

Carl Theodore Goldenberg acts as representative in the Virginia territory, with headquarters at Lynchburg.

Earl H. Pellett has been appointed manager of the Boston, Massachusetts, branch and will also supervise the Providence, Rhode Island, territory.

C. W. Smith has been made manager of the Washington, D. C., territory.

"Rubber Machinery," Mr. Pearson's newest book, filled with valuable information for rubber manufacturers, is now ready for mailing. Price, \$6.

THE REPUBLIC COMPANY'S NEW PRESIDENT.

At a recent meeting of the Republic Rubber Co., Youngstown, Ohio, Guy S. Norwood was elected president. Mr. Norwood is well fitted to assume this important position, having



Campbell Studio.

G. S. NORWOOD.

been intimately connected with the rubber business since the opening of this century. He is still a young man, having been born in Allegheny, New York, in February, 1876. After completing his education, which was obtained at the local schools, the Cook Academy at Montour Falls, New York, and Cornell University, Ithaca, New York, Mr. Norwood went to the Eastman Kodak Co., Rochester, New York, in 1898 as industrial engineer. In 1901 he entered the

engineering department of The B. F. Goodrich Co., Akron, Ohio, five years later resigning to accept the management of the cost department of the Diamond Rubber Co., Akron. In 1910 he became director and assistant treasurer of that company and when the corporation was consolidated with The B. F. Goodrich Co. in 1912 he was elected to the directorship and given the position of assistant treasurer of the Goodrich company. In 1913 he became assistant secretary and early this year was elected secretary, the position which he resigned in order to accept the presidency of the Republic Rubber Co.

Mr. Norwood is a man of pleasing personality and has a wide circle of friends in the rubber business who will wish him every success in his new position. He is a member of the American Society of Political and Social Science and of the Franklin Institute. He is a thirty-second degree Mason, is treasurer of the Young Men's Christian Association of Akron and a member of the Akron University Club, of which he was president last year.

In this connection it might be well to mention that Thomas L. Robinson, former president of the Republic company, will continue as chairman of the board and in charge of the financial management of the corporation.

EXPANSION OF THE VULCAN RUBBER CO.

The Vulcan Rubber Co., Erie, Pennsylvania, is building a railroad siding to its plant from the line of the Pennsylvania Railroad. The new brick, fireproof factory buildings are also under construction, one three stories high and the other a one-story structure. An additional calender, mills and other equipment have been ordered and it is hoped to have the new buildings in operation by August 1. The present plant is being operated day and night on the company's products—inner tubes, solid truck tires, cements and tire accessories—and the manufacture of a hand-made fabric automobile tire is contemplated. The officers of the Vulcan company are as follows: M. Liebel, Jr., president; Edward Heuer, vice-president and treasurer; Bernard Cochran, secretary.

NEW INCORPORATIONS

American Tire Distributing Co., The, May 10 (Indiana), \$25,000. Otto E. Anthony, Solon B. Selleck, John L. McFarland—all of Indianapolis, Indiana. Principal office, Indianapolis, Indiana. To buy and sell automobile tires, tubes and accessories.

Atlanta Tire & Rubber Co., Inc., June 25 (New York), \$5,000. Sydney Bernheim, 35 Nassau street, New York City; Catherine A. Weldon, 591 Seventh street, and Harry H. Jacobson, 555 Grand street—both of Brooklyn, New York.

Cleveland-Standard Tire & Rubber Co. of Los Angeles, May 17 (California), \$20,000. H. M. Lieb, 524 West Fiftieth street; E. B. Conlee, 245 South Hobard Boulevard, and E. L. Sprague, 1641 Seventh avenue—all of Los Angeles, California. Principal office, Los Angeles, California.

Condex Tire Co., Inc., June 16 (New York), \$75,000. Geo. Rosendale, Solomon C. Whitbeck and B. L. Walter—all of 52 Broadway, New York City. Tire repairs, etc.

Crescent Rubber Corp., June 11 (Delaware), \$1,500,000. E. R. Kelley, Elgin, Illinois; Geo. H. Gilberds, and R. S. Hanford—both of Chicago, Illinois. The office within the State of Delaware is with the Corporation Trust Co. of America, 486 duPont building, Wilmington, Delaware. To carry on a general rubber and rubber products manufacturing, buying and selling business.

Dodge, H. C., Inc., May 29 (New York), \$1,000. Harold C. Dodge, East Orange, Henry T. Randal, Maplewood—both in New Jersey, and Frederick K. Nixon, 120 Riverside Drive, New York City. To deal in insulating materials, etc.

Dural Rubber Corp., The, June 4 (New Jersey), \$200,000. J. E. Gill, Caleb S. Green and N. A. K. Bugbee—all of Trenton, New Jersey. Principal office, Room 711, Broad street Bank Building, Trenton, New Jersey. To manufacture, buy, sell, import, export and generally deal in rubber tires and rubber tubes for air craft, automobiles and other vehicles; rubber goods of every kind, character and description, all goods of which rubber is a component part, and the various materials entering into the manufacture of any and all such goods, etc.

Elm City Rubber Co., Inc., June 22 (New York), \$1,500. Sydney Bernheim, 35 Nassau street, New York City; C. A. Weldon, 591 Seventh street, and Harry H. Jacobson, 555 Grand street—both in Brooklyn, New York. Tires, etc.

Hilgert Shoe Corp., April 12 (Hornell), \$107,500. George W. Harper, L. J. Harper—both of 232 Sherman avenue, New York City, and James Harper, 343 Enfield street, Brooklyn, New York. Rubber and leather goods.

Hurd Tire Corp., May 26 (Delaware), \$150,000. George L. Hurd, Tenaflly, New Jersey, George A. Wagner and Arthur G. Hurd—both of 754 Oakland Place, New York City. The office in the State of Delaware is with the Capital Trust Co. of Delaware, Dover, Delaware. To manufacture, buy, sell and deal in tires, motor engines, etc.

Kant Sink Swimming Harness Co., June 1 (Michigan), \$5,000. Milton D. Bryant, Robert W. Lyon. Principal office, Traverse City, Michigan. To manufacture rubber goods specialties.

Keystone Resilient Wheel Co., May 21 (Delaware), \$600,000. Herbert E. Latter, C. L. Rimlinger—both of Wilmington, Delaware, and Clement M. Egner, Elkton, Maryland. The office in the State of Delaware is with the Corporation Trust Co. of America, 486 duPont Building, Wilmington, Delaware. To manufacture and sell resilient wheels for automobiles and to deal in all kinds of tires.

Lake City Tire & Supply Co., The, April 27 (Ohio), \$10,000. A. H. Massey (president), 1298 West One Hundred and Tenth street; C. B. Bayly (vice-president), Leader News Building; L. J. Brown (treasurer), 11431 Clifton Boulevard, and H. C. Christy, Jr., (sales manager), 1301 West One Hundred and Sixth street—all in Cleveland, Ohio. Principal office, 4205 Euclid avenue, Cleveland, Ohio. Jobbers of automobile tires and supplies.

M. K. B. Rubber Co., May 18 (Delaware), \$50,000. Herbert E. Latter, C. L. Rimlinger—both of Wilmington, Delaware, and Clement M. Egner, Elkton, Maryland. The office of the corporation within the State of Delaware is with the Corporation Trust Co. of America, duPont Building, Wilmington, Delaware. To buy, sell and generally deal in rubber tires, tubes and accessories of all kinds for automobiles.

Manhattan Motor Supply Co., Inc., June 21 (New York), \$10,000. William Miller, 1074 Lexington avenue; Walter V. Burke, 355 West Fifty-eighth street, and Bailey C. Elliot, 1400 Broadway—all in New York City. To deal in auto tires, supplies, etc.

Moore & Ward, June 12 (New Jersey), \$25,000. George C. Moore, Harcourt S. Ward—both of 123 Washington street, and Robert N. Shoemaker, 790 Broad street—all in Newark, New Jersey. Principal office, 123 Washington street, Newark, New Jersey. To make, purchase and sell rubber tires and all other goods of which rubber is a component part, etc.

Moscow Airless Tire Co., Inc., June 1 (New York), \$50,000. Jonas Gerwitz, 1823 Prospect Place, Henry Gerwitz, 354 Saratoga Avenue,—both in Brooklyn, New York, and Rudolph Moskowit, 315 Fifth street, New York City. Principal office, New York City. Auto tires and accessories.

New Era Double Tire Co., Inc., May 29 (New York), \$5,000. William W. Kupperman, 117 Oakland street; Harry P. Kupperman, 911 Grape street, and Gerson Rubenstein, 164 Renwick Place,—all in Syracuse, New York. Principal office, Fabius, New York. To deal in automobiles and tires.

Peavey Rubber Co., The, June 1 (Texas), \$100,000. R. A. Peavey, N. P. Deavours, and E. W. Ware—all of Dallas, Texas. Principal office, 2036 Commerce street, Dallas, Texas. To sell tires at wholesale and retail.

Radium Golf Ball Co., The, April 12 (New York), \$5,000. Leo L. Levenritt, (president), 128 Broadway, New York City; Ellis Miller, (vice-president), London, England, and J. S. Worthington, Midsunvey Golf Club, England. Principal office, 128 Broadway, New York City. To introduce and promote the sale of a golf ball known as Radio.

Record Syringe Laboratory, Inc., May 28 (New York), \$3,000. Irvin Rosenfeld, Joseph L. Rosenfeld, both of 1538 Minford Place, and Herman A. Weis, 1687 Southern Boulevard—all in New York City. Principal office, Bronx, New York. To manufacture syringes and surgical goods.

Serlin Tire Co., May 23 (Illinois), \$10,000. Nathan Serlin, Sam Serlin and Max Serlin. Principal office, 1300-2 South Michigan avenue, Chicago, Illinois. To manufacture, buy and sell, at wholesale and retail, tires and automobile accessories, of every kind and nature, etc.

Southern Tire & Accessories Co., April 24 (Alabama), \$2,500. Solon Jacobs, J. F. Fenton, and Evans Dunn. Principal office, Birmingham, Alabama. To buy and sell automobile tires and tubes and some other rubber goods and to handle a line of automobile accessories. This company succeeds the Solon Jacobs Tire Co.

Texas Tire Co., April 18 (Texas), \$25,000. Sam Hefley, H. W. Hefley—both of Cameron, Texas, and E. M. Hampton, Dallas, Texas. Principal office, Dallas, Texas. To manufacture and sell automobile tires and accessories.

Tire Stores Co. of America, April 4 (West Virginia), \$500. Milton Reinsberg, 7023 Joffrey street, and Simon Reinsberg, 722 East Fiftieth street—both in Chicago, Illinois. Principal office, 906-6 North Clark street, Chicago, Illinois. To generally deal in tires for automobiles, bicycles, carriages, etc.

Whinihan Brothers & Co., Inc., May 23 (New York), \$5,000. Sylvester M. Whinihan, Paul K. Whinihan and Charles B. Brittin—all of Buffalo, New York. Principal office, Buffalo, New York. Tires and tubes, etc.

CANADIAN CONSOLIDATED NOTES.

The new building at 201 Inspector street, Montreal, Canada, now occupied by the Canadian Consolidated Rubber Co., Limited, contains the executive offices, the sales department of the Montreal branch, and the raincoat manufacturing department. The location of this building is very central, and its nearness to the railroad stations will be a decided convenience to out-of-town customers.

At the Dominion Tire Factory of the Montreal company a first aid department has been installed, one of the buildings having been remodeled for the purpose. It will comprise an operating room, rest room and ante-room and will be equipped with complete surgical and nursing equipment in charge of a graduate nurse.

Contracts have been let for the erection of a home building at Port Dalhousie for the female workers of the Maple Leaf factory of the company.

The Granby Rubber Co., Granby, Quebec, Canada, is building new offices and warehouses, which are needed for the growing business there. As soon as the new building can be occupied the present office building will be demolished, and the new warehouse will be extended over the ground thus vacated.



NEW EXECUTIVE BUILDING OF CANADIAN CONSOLIDATED RUBBER CO. LIMITED, AT MONTREAL, CANADA.

THERMOID RUBBER CO.

Through the addition of new hydraulic press equipment, the Thermoid Rubber Co., of Trenton, New Jersey, has increased its yearly output of Thermoid Hydraulic Compressed Brake Lining nearly 30 per cent. This department is running over-time at full capacity, averaging an output of over 37,000 feet per day. The output for the year of 1916 totaled over 9,000,000 feet, which will be increased this year by the addition of the new press equipment to nearly 12,000,000 feet.

Harold F. Blanchard, former district manager of Philadelphia, Pennsylvania, office of the Thermoid company, has been transferred to the factory as manager of sales and advertising. He succeeds D. O. Pohlman, who has taken charge of the Central Western District, with headquarters at the Chicago branch office. J. H. Liston, formerly in charge of the Chicago territory, has joined the sales organization of the Standard Parts Co., Cleveland, Ohio.

MACKINTOSH WITH MAPLE LEAF TIRES, LIMITED.

Maple Leaf Tires, Limited, Belleville, Ontario, Canada, has elected as president W. M. Mackintosh, formerly with the North British Rubber Co., Limited, Edinburgh, Scotland, and several other European rubber concerns. It has also made a contract for his services for three years. Mr. Mackintosh has transferred to the company the Canadian rights for "Galbulose," a chemical combination of fossil resin and cellulose for proofing fabrics (described in THE INDIA RUBBER WORLD, November 1, 1914).

COPY OF INDEX TO "Rubber Machinery" will be sent free upon request.

THE SEAMLESS RUBBER CO., INC.

The real estate, machinery, trade-marks and good will of the Seamless Rubber Co., New Haven, Connecticut, having been purchased at public sale for \$681,000, the business will be continued by a corporation capitalized at \$1,500,000, under the name of the Seamless Rubber Co., Inc., with office and factory at New Haven. The new company will not manufacture tires and inner tubes, having disposed of the equipment formerly used in this branch of the business, but will continue on a larger scale the production of druggists' and stationers' and

surgical sundries, hospital supplies and sporting goods. The new company is rapidly taking back the 700 employees of the older company; is adding new machinery and equipment; is sending the salesmen out on their former territories, and will continue the branch offices in New York City; Chicago, Illinois; San Francisco, California, and Toronto, Canada, but will carry no stocks of goods at these branches, shipping all goods from New Haven.

The officers of the company are F. O. Williams, president and general manager; F. W. Dodge, vice-president and assistant manager; H. W. Gordon, secretary and sales manager, and W. C. Hutton, treasurer.

RUBBER SCRAP DIVISION OF THE NATIONAL ASSOCIATION MEETS.

The meeting of the Rubber Scrap Division of the National Association of Waste Material Dealers was held June 19 at the Hotel Astor, New York City, with Paul Loewenthal in the chair. The increased attendance and active interest of those present were favorable indications of the progress of this division. The most important business transacted was the discussion attending the adoption of the new standards of rubber scrap specifications and packing known as Circular C, that will be sent out to the trade July 1. Full text of this circular is published on page 598 of this issue.

WORKMEN'S COMPENSATION INSURANCE.

For some time past the National Association of Waste Material Dealers has been endeavoring to secure lower rates for workmen's compensation insurance. At present, rubber stock dealers enjoy the lowest rate among waste material classifications, but it is expected that metal scrap and scrap iron dealers will soon be granted much lower rates than hitherto, and that the term "junk dealers" may be eliminated entirely, a new classification being provided to cover dealers handling waste paper exclusively. Present rates in various states for rubber stock dealers receiving, handling, baling and shipping old rubber, not available for division of payroll, are as follows: New York, \$2.01; Pennsylvania, \$0.88; Massachusetts, \$1.21; Illinois, \$1.64; Michigan, \$1.43; New Jersey, \$1.06; Maryland, \$1.15; Wisconsin, \$1.33; Indiana, \$1.56; Connecticut, \$1.23; Iowa, \$1.09; Louisiana, \$1.22; Maine, \$1.01; Nebraska, \$1.22; Rhode Island, \$1.10; Vermont, \$1.01; Kansas, \$0.89; Minnesota, \$1.17.

EDWARD S. BABCOX.

THERE are few, if any, positions in the advertising world which require so much ability, versatility, and solid hard work as publicity managers in the automobile and allied industries.



E. S. BABCOX.

A man who stands out prominently in this field is Edward S. Babcox, advertising manager of the Firestone Tire & Rubber Co., of Akron, Ohio, whose work in this department has made the name of Firestone almost a household word throughout the United States, as well as famous in far countries.

Although a young man in years, he has had a long and successful experience in the publicity field. Previous to coming to the Fire-

stone company he had been in charge of the advertising of the Burroughs Adding Machine Co., of Detroit, Michigan, and later of the Yawman & Erbe Manufacturing Co., Rochester, New York. That he is up-to-date was proved at the recent convention of the Association of National Advertisers at Detroit, when he brought home to his fellow publicity men the close relationship of advertising and selling, by exhibiting a motion picture film, which was produced for the sole purpose of impressing upon the sales force of the Firestone company the immense value of advertising as a selling argument.

At that convention Mr. Babcox was elected vice-president, which was a tribute to his earnest efforts in carrying out the aims of that organization, especially in eliminating fraudulent advertising.

FIRESTONE PROMOTIONS.

J. E. Mayl, formerly branch manager at Memphis, Tennessee, for the Firestone Tire & Rubber Co., has been appointed manager of the company's Cleveland, Ohio, branch, E. C. Thomas taking his place at Memphis.

J. H. Dutch has been made manager at Pittsburgh, Pennsylvania.

A. T. Smith, formerly manager of the Los Angeles branch, has been placed in charge of the San Francisco, California, branch, F. C. Flickinger succeeding him at Los Angeles.

Roscoe Homan, who joined the Firestone forces in 1914, as Omaha salesman, has been appointed manager of the Oklahoma City branch.

John Beakley, formerly Texas credit manager, is now Texas manager.

TIRE REPAIR GOODS BUSINESS BRISK.

The rising cost of automobile tires is leading motorists generally to devote more attention to their tire equipment. Cars are being driven more carefully, poor roads and highways under repair are being avoided whenever possible, and wheel alinement and brakes are being tested. It has been discovered, too, that "a stitch in time saves nine," and sales in repair goods of every sort are showing a big increase as a result of the call for greater tire economy. Preparations for filling cuts and bruises in casings are particularly in demand.

AJAX APPOINTS SALES SUPERVISORS.

H. L. McClaren, vice-president and general manager of the Ajax Rubber Co., Inc., New York City, has worked out a new system of sales supervision in the various selling territories, and in adopting this system of bringing about a closer relationship between Ajax dealers and the home office, the following men have been promoted to the position of supervisors in the territories named:

S. L. Blood, upper New York; Richard Cluman, Connecticut; R. T. Jollie, Jr., Ohio, West Virginia and Kentucky; F. C. Burnett, Texas; W. J. Ryan, Minnesota, northern Wisconsin and northern peninsula of Michigan; P. V. Dowling, New Jersey and Pennsylvania; William M. Pattison, Maryland, North Carolina, South Carolina, Virginia and District of Columbia; S. H. Pierce, Illinois and southern Wisconsin; E. D. Winans, Rhode Island, Maine, Vermont and Massachusetts; E. E. Pickering, Nebraska, a part of Kansas, North Dakota, South Dakota and Colorado; A. G. De Vries, Indiana and Michigan; and G. L. Severcool.

FISK TIRE SERVICE

In order to aid motorists to get greater mileage from their tire equipment, The Fisk Rubber Co., Chicopee Falls, Massachusetts, has established approximately 130 branch houses in principal cities throughout the United States with completely equipped service stations where any work, aside from actual repairs, will be done upon tires free of charge and without obligation of any kind whatsoever. This service is available to every person who drives a car, regardless of the make of tires he uses, and includes changing of tires, mounting spares on rims or wheels, inflation, testing of air pressure, wheel alinement and brakes, regular and frequent expert inspection and advice. A complete branch list will be sent to tourists on request.

Service is the maxim of the Fisk company and this unique and practical application of it will greatly reduce the tire expense of those who avail themselves of it. Its value to tire user and dealer alike cannot be overestimated.

PERSONAL MENTION.

Joseph M. Ward, for some time past connected with the Indianapolis, Indiana, branch of the United States Tire Co., has been appointed district manager for that section. C. A. Oldham, formerly identified with the same branch, has been made district manager of the St. Louis, Missouri, branch.

C. J. Connors, formerly special representative of the Marathon Tire & Rubber Co. in the Southwestern States, has been appointed manager of the company's division office and warehouse in St. Louis, Missouri.

Robert Graves, Jr., 1668 Broadway, New York City, is distributor for the well-known tires and tubes of the Gryphon Rubber & Tire Corp. A. C. Galbraith, formerly New York representative of The Globe Rubber Co., Trenton, New Jersey, is associated with Mr. Graves as New York sales representative.

A. J. Pennington resigned his position as general superintendent of the tire and tube mill of the Brunswick-Balke-Collender Co., Muskegon, Michigan, on June 1, to take effect August 1, having become associated as general manager with a large Eastern company not affiliated with the rubber industry.

A HANDY DESK APPURTENANCE IS BEING SENT OUT BY THE Connecticut Mills Co., of Danielson, Connecticut, and Taunton, Massachusetts. It is a paper-weight of glass and contains a drawing representing the combined mills of the company and the houses erected for employes. Embedded in the bottom of the paper-weight is a square mirror sufficiently large to be a convenient accessory to the office desk.

COMMANDANT OSTERRIETH IN AMERICA.

MANY of the visitors to the International Rubber and Allied Trades Exhibitions of 1911 and 1914 will remember Commandant Leon Osterrieth as the delegate for Belgium. With his



CAPTAIN COMMANDANT LEON OSTERRIETH

brother and other relatives he was associated with Osterrieth & Co., Antwerp, a firm of merchants dealing in rubber and allied tropical products and owning considerable interests in the plantation industry of Java, and British Malaya. When war was declared in 1914 Commandant Osterrieth was on his way to attend the Rubber Congress in Java. He heard the news at Port Said, returned hastily and until recently has been fighting with his countrymen in the trenches of Flanders. His mother, too, well known and beloved in Antwerp for her many acts of benevolence covering a period of many years, has continued to do much to alleviate the suffering of those about her. Commander Osterrieth's active cooperation has aided materially in the success of the International Rubber Exhibitions, and it will be recalled that rubber from his own and his brother's estates was exhibited in New York in 1912. The welcome of the American rubber trade to such a distinguished visitor is the warmer in that it is extended to an honored comrade in arms.

PERSONAL MENTION.

George O. Simpson has been appointed manager of the Kansas City branch of The B. F. Goodrich Co., succeeding F. A. Oberheu. Mr. Simpson has been connected with the Goodrich company for ten years, having been for three years a salesman in the Philadelphia, Pennsylvania, territory and for the past seven years manager of the Philadelphia branch.

The transfer of George O. Simpson, Philadelphia branch manager of The B. F. Goodrich Co., and the welcome of his successor, Edward H. Fitch, was the occasion of a recent banquet given at the headquarters of the Philadelphia Automobile Trade Association. Prior to the dinner, a solid silver service was presented to Mr. Simpson as a demonstration of the loyalty and friendship of his associates. Among the speakers was C. B. Raymond, second vice-president of the Goodrich company.

Alfred L. Aiken, governor of the Federal Reserve Bank of Boston and a potent factor in the success of the New England drive for Liberty Bond subscriptions, is a grandson of the late Governor Buckingham of Connecticut, who was one of the founders of the old Hayward Rubber Co., of Colchester.

O. R. L. J. Magnee, who has rubber planting interests in Sumatra, was in New York City last month on business.

C. E. Labelle, treasurer of the St. Jerome, Quebec, factory of the Canadian Consolidated Rubber Co., Limited, recently married Miss Jeanne Belair, the couple taking a honeymoon trip down the Saguenay River. The overseers and office staff presented to them a cabinet of table silver.

TRADE NOTES.

The Central Tire Co., distributor of Diamond tires, San Antonio, Texas, has increased its capital stock from \$12,000 to \$25,000.

The Polack Tyre & Rubber Co., New York City, has moved its general and sales offices to more commodious and pleasanter quarters on the second floor of the Motor Mart, 1876 Broadway. This change was made necessary by a rapidly expanding business with truck users and truck manufacturers.

The Perfection Asbestos Tire Co., Cleveland, Ohio, has been formed as Ohio distributor for The Perfection Tire & Rubber Co. H. L. Oakley is president and Edward F. Carran, secretary and treasurer.

The Perfection Tire & Rubber Co. is enlarging its plant at Wabash, Indiana, and installing machinery that will triple its capacity. This factory is utilized for the manufacture of asbestos automobile tire fabric, asbestos yarns and fabrics, asbestos gaskets and packing, and asbestos shoe soles.

Bids are being received for the erection of a one and two-story building, 125 by 60 feet, to be built for the Plexus Tire & Rubber Co., Philadelphia, Pennsylvania.

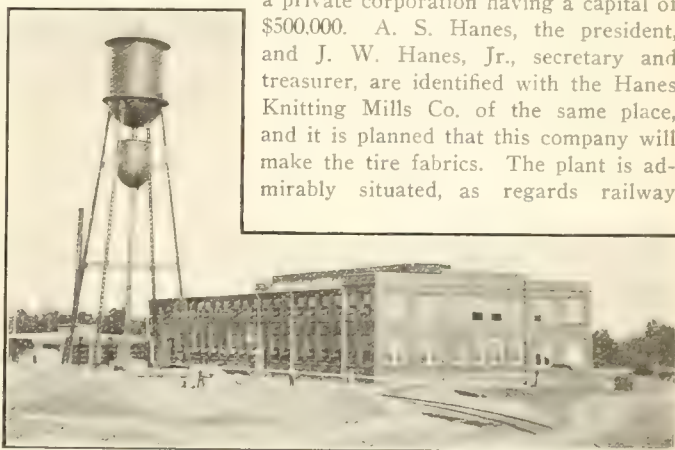
The Newark Rubber Tire Co., Newark, New Jersey, dealer in standard makes of tires and tubes, has increased its capital stock from \$10,000 to \$100,000. The officers of the company are: William F. Rothlisberger, president; Harry Martin, vice-president and secretary; E. B. Degenring, treasurer.

The plant of the Mid-Continent Tire Manufacturing Co., located at Wichita, Kansas, is rapidly nearing completion and it is claimed that it will be the largest factory building in Kansas. That the new plant will be turning out "Made in Wichita" tires by midsummer is the hope of the management.

The Camel Tire Co., jobber in standard brand tires, has opened new quarters at 712 Madison avenue, Toledo, Ohio.

HANES RUBBER CO.

The Hanes Rubber Co., Winston-Salem, North Carolina, will soon start manufacturing tires and inner tubes, the daily capacity being 300 tires and 200 tubes. This is not a stock company, but a private corporation having a capital of \$500,000. A. S. Hanes, the president, and J. W. Hanes, Jr., secretary and treasurer, are identified with the Hanes Knitting Mills Co. of the same place, and it is planned that this company will make the tire fabrics. The plant is admirably situated, as regards railway



PLANT OF THE HANES RUBBER CO.

facilities, being closely connected with the Southern, the Norfolk & Western and the South Bound railways. Being near a town of 35,000 inhabitants, in a cotton industrial center, the plant is very favorably situated also, as regards labor supply.

It is reported that the North Star Rubber Co., of St. Paul, Minnesota, will soon be in a position to operate. The company has temporary headquarters in the National Exchange Bank Building.

THE RUBBER TRADE IN BOSTON.

By Our Regular Correspondent.

ONE of the most dangerous fires this year in Boston occurred June 4, when the rubber substitute plant of T. C. Ashley & Co., in the South Boston section, was destroyed. Situated as the factory was in a neighborhood of inflammable structures, the fire was peculiarly difficult to fight. About three acres were burned over, including a large stable, and a building occupied by the International Waste Co., where 1,300 bales of cotton waste were burned. The Ashley factory was totally destroyed, but with the enterprise characteristic of the concern a new location has already been secured, and it is expected that the firm will resume manufacturing within two or three weeks. The new plant is in a substantial brick structure in the Brighton section of this city. The business office will remain, as heretofore, at 683 Atlantic avenue, opposite the South Terminal Station.

* * *

The Doughty Tire Co., whose factory is at Providence, Rhode Island, has opened an office in the new Little Building, corner of Boylston and Tremont streets in this city, and is doing some very effective advertising in the daily press. This company is manufacturing the tire invented and patented by Henry J. Doughty which was fully described in THE INDIA RUBBER WORLD, February 1, 1916. A special loom weaves a continuous fabric strip molded to the exact width and shape of the tire. A special friction calender impregnates this curve-shaped fabric with rubber, and the carcass is made complete by winding the fabric four times by machinery. Not more than five minutes is necessary to make the carcass ready for the cushion, breaker and outside rubber tread stock. The vulcanizing machine has a collapsible core made in eight segments, in combination with a three-part mold, to form the outside of the cover. All these parts are supplied with means of heating. The casing is laid in place and allowed to remain in the hot mold from ten to 20 minutes, according to size, to complete the vulcanization under a hydraulic pressure of 25 tons. The result is a tire which it is claimed is much stronger and which, because of the quickness of production can be produced more economically than the regulation tire. The company at present is manufacturing only one size, 30 by 3½ inches, but will make other sizes in the near future. It will enlarge its present equipment in Providence and plans in the near future to take over a large factory in Boston. The business office mentioned above is in charge of Henry M. Whitney, well known in financial and public service circles in Boston.

* * *

The Boston Woven Hose & Rubber Co., of Cambridge, gave a unique entertainment to over four-score of its New York City customers recently. A dinner was tendered them at the Machinery Club, in that city, at which Geo. E. Hall, vice-president and general manager presided. Addresses were made by R. J. Owens, manager of the New York office, and J. W. Fellows, factory manager. The feature of the evening was the presentation of a motion picture "The Story of Rubber, What it is and What it Does," illustrating the industry from the gathering of crude rubber in Brazilian forests and East Indian plantations, through the various processes of manufacture at the company's works at Cambridge. This exhibition was accompanied by a descriptive lecture by R. E. Conder, the advertising manager of the company. The affair was highly appreciated by the guests of the evening.

* * *

The B. F. Goodrich Co.'s salesroom window on Boylston street has become noted for its original and attractive displays. Last month the entire space was devoted to exploiting Textan fiber soles. The setting consisted of very effective full-size reproduction of the front porch of a suburban residence, the front door, windows, electric lanterns and portico columns being

true in detail. Chairs and hammocks were provided for father and mother and the little daughter. Both the latter were pointing to the soles of their shoes, on which the trade-marked word was visible. The foreground represented a lawn, and on the "grass" were samples of Textan soled shoes and Textan soles. It was surprising to see how many pedestrians and motorists stopped to admire the display.

* * *

Early last month the Hood Rubber Co. moved its tire department into the new building built expressly for it, and has a far larger tire capacity. It is hoped that it can now keep pace with the increasing demand for tires. The new foundry building is also finished and occupied. A new heater house is now in process of erection. The footwear department is running to full capacity, and the daily ticket is now 76,000 pairs of rubbers, boots and tennis.

* * *

Frederick T. Ryder, Jr., manager of the mechanical department of the Dexter Manufacturing Co., Boston and South Braintree, Massachusetts, was married June 2 at Burlington, Kansas, the bride being Garda Gertrude, daughter of Mr. and Mrs. Samuel D. Reid of that city. The couple now are on their honeymoon trip, and will reside in the Allston district of Boston. Mr. Ryder is the son of Frederick T. Ryder, for some years private secretary to the late E. S. Converse, and now prominent in the Rinex sole department of the United States Rubber Co.

* * *

A curious accident at a Peabody tannery early last month might be used as an argument in favor of rubber over leather belting. When the engineer turned on steam at the factory, a throttle valve blew out and steam under pressure of 50 pounds escaped, filling the boiler- and engine-rooms. This so injured the belts as to necessitate a shut-down of the works until belting experts had repaired the damage.

* * *

The Summer Street Tire Co. has opened a retail store for the sale of tires and accessories at the junction of Summer and Federal streets, very near the South Terminal Station. It is in charge of E. V. Murphy.

* * *

The Cor-Nix Rubber Co., which has stores for the sale of tires and rubber goods at Lynn and Beverly in this state, has just opened a third store at 46 North Main street, Fall River, in charge of John M. Corcoran, formerly a traveling salesman for the United States Rubber Co. The members of this concern are James F. Corcoran, Joseph P. Nixon (from whose names that of the company is derived) and William D. McCarthy, all of whom have had practical experience in the employ of leading rubber companies.

* * *

E. M. & F. Waldo, color manufacturers, New York City, will open a branch office at 10 High street, Boston, in order to give the New England trade the attention needed. T. H. Cushman, who for over two years has been New York and New England salesman for the Waldo concern, will be the manager.

* * *

Boston is getting to be more and more a convention city, chiefly through the exertions of the Chamber of Commerce, which is doing splendid work in many directions. It has a Convention Bureau to induce associations to hold important meetings here. Representatives of the American Chemical Society have informed this bureau that between 1,000 and 1,500 would unquestionably be present at its annual convention the week of September 10. The meetings of the society will be held at the Technology Buildings, with headquarters at the Hotel Lenox. The last convention held in Boston was in 1909, which was the most successful and largest attended of any in the history of the society.

Readers of THE INDIA RUBBER WORLD doubtless remember that the Forsyth Dental Infirmary in this city owes its establishment to the philanthropy of the Forsyth brothers of the Boston Belting Co. It will therefore be of interest to state that the trustees of this institution have established a course for the instruction of dental surgeons for the Reserve Corps of the United States Army. This course was given without charge by highly qualified instructors, who patriotically volunteered their services. Examinations for appointments are to be held later.

* * *

Honors continue to come to President Thomas A. Forsyth. The University of Pittsburgh conferred upon him last month the degree of Doctor of Laws. With a number of the directors of the Infirmary he attended the commencement exercises at the University at Pittsburgh, Pennsylvania. In an address there he reported that the 82 men of the graduating class of 84 in the department of dentistry have enlisted in the dental reserve corps. The two other graduates, women, will enter Red Cross work.

* * *

Elisha E. Converse, son of Harry E. Converse, president of the Boston Rubber Shoe Co., and grandson and namesake of Deacon Converse, the founder of that company, has enlisted in the Naval Reserve, and has received his commission as ensign.

* * *

R. F. Foote, superintendent and general manager of the Independent Rubber Co., Limited, Merritton, Ontario, Canada, was in Boston early last month. During his sojourn here, he visited the factories of the United States Rubber Co. in this vicinity. Mr. Foote has many friends in the trade, not only in Canada but in this country.

THE RUBBER TRADE IN AKRON.

By Our Regular Correspondent

THE big athletic meet on Decoration Day, in which the employes of the Goodrich, Firestone and Goodyear factories participated in friendly rivalry, was an even greater success than in previous years, over 15,000 people witnessing the different events. The B. F. Goodrich Co. carried off the highest honors, being awarded the large cup shown in the illustration on the total number of points scored in the meet, and also one of the smaller cups for winning the one-mile relay race. The other cup was awarded to the Goodyear Tire & Rubber Co.



The following table indicates the character of events and the points scored in the meet:

Events.	Goodrich.	Goodyear.	Firestone.
100 yard dash	3	1	5
Shot put	3	5	1
Mile run	6	3	0
210 yard dash	4	3	5
120-yard high hurdles.....	3	1	5
Pole vault	6	6	0
440-yard dash	4	1	0
880-yard run	5	1	0
Discus throw	0	4	0
Five-mile run	0	4	5
High jump	1	4	4
Broad jump	1	3	5
220-yard high hurdles.....	3	1	5
Javelin throw	1	5	3
One-mile relay race	5	3	1
Total points	56	42	37

* * *

Some idea of the myriad tasks to which rubber is put may be gathered from the knowledge that the molded goods department of The B. F. Goodrich Co. employs approximately 50,000 molds in the manufacture of 25,000 different rubber articles. In this department alone 1,000 rubber compounds are used.

George Lippincott Brown, who has recently become connected

with The B. F. Goodrich Co., has been identified with sales promotion work in sporting goods in New York for ten years, with Abbey & Imbrie, Abercrombie & Fitch Co., and as sales manager for A. F. Mersselbach & Bro., of Newark, New Jersey. Mr. Brown is an enthusiastic and skilful fisherman, and is well known among the sportsmen's organizations.

W. O. Rutherford, general sales manager of the Goodrich company, delivered an address at the annual World's Salesmanship Congress in Detroit, Michigan, last month.

The Portage Rubber Co. is now building two additions to its plant in Barberton, each approximately 75 by 100 feet, three stories high, of brick, steel and concrete construction. All of the equipment is ordered, and it is expected that the new additions will be in operation by next January, enabling an increase in production of fully 800 more tires and 1,000 more tubes per day.

The Portage company recently distributed \$45,000 in payment of its quarterly dividend of 2½ per cent.

The Firestone Tire & Rubber Co., up-to-date in all of its methods, is insistent upon proper attention to the teeth of its employes as an important factor in their health. No less than 20,000 cases are treated in the clinic annually, advice and service being free to all employes.

Edward S. Babcox, advertising manager of the Firestone company, has been elected vice-president of the Association of National Advertisers.

* * *

The production of the Amazon Rubber Co. has increased five-fold within the last ten months, and plans are now being considered for a new five-story brick factory building, to be equipped with the latest rubber machinery.

L. J. Myers has been placed in charge of Amazon sales.

* * *

E. H. Barnhill has been appointed manager of the fabric department of the Goodyear company, succeeding Theodore Wood.

* * *

The Loewenthal Co., of New York and Chicago, dealer in rubber scrap, has opened a branch office in the Delaware Building, Akron, Ohio, under the managership of H. C. Jones, formerly in the salvage department of The B. F. Goodrich Co.

THE RUBBER TRADE IN RHODE ISLAND.

By Our Regular Correspondent.

THE census of manufacturers for 1914 issued about the middle of the past month by the Bureau of Census of the United States Department of Commerce contains information of more than usual interest to the rubber industry. Rhode Island ranks nineteenth among the States in value of products of its manufacturing industries, and fourteenth in average number of wage earners.

During 1914 there was an average of 1,541 wage earners employed in the rubber industry, the total value of whose production was \$6,088,988, the value added by manufacture being \$2,026,579.

A comparative summary for 1904, 1909 and 1914 is very interesting and instructive, showing the following: In 1904 there were 9 establishments in the Rhode Island rubber industry, employing 991 persons, receiving wages that amounted to \$417,000; using material costing \$1,636,000, the value of productions being \$2,582,000. In 1909 there were only 5 establishments, employing 774 wage earners, using 1,075 primary horse power, earning \$320,000 in wages, using materials costing \$2,075,000 and producing \$3,143,000. In 1914 six establishments employing 1,541 used 3,350 primary horse power. Wages amounted to \$821,000, the cost of materials was \$4,062,000 and the value of the production was \$6,089,000.

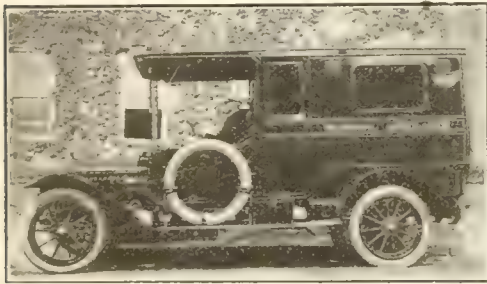
The United States Rubber Co. has purchased outright the entire business and chain of plants of the Rubber Goods Manufacturing Co., including the factory at Providence. Since 1905 the United States Rubber Co. has held a controlling interest in the corporation that it has now taken over, and the transfer just recorded is in line with the announced policy of the parent company to centralize the administration of its many holdings.

* * *

Col. Samuel P. Colt, president of the United States Rubber Co., and a party of friends left early in the month for Col. Colt's camp in the Maine woods, where they enjoyed three weeks of fishing and camping. The camp is located on a chain of lakes at the base of Mount Katahdin amid beautiful scenery about 35 miles up the Penobscot river from Norcross, the trip to Norcross being made in canoes. Trout and bass abound in the lakes and streams of this territory.

The party consisted of the following: Mr. and Mrs. Andrew Weeks Anthony, Col. and Mrs. Harold J. Gross, Dr. Calvin S. May, Walter S. Ballou, Mr. and Mrs. E. A. Barrows, Mrs. Florence Beresford, Ernest Hopkinson, Countess Eleanor Moroni, Mrs. Imogene S. Waldron, S. X. Constantinidi, Mrs. John W. Bicknell, H. Stuart Hotchkiss, Nathaniel Myers and A. W. Baker.

It may be remembered that the overseers and employes of the National India Rubber Co. decided to purchase a motor ambulance as a memorial to the late LeBaron C. Colt, former vice-president and manager of that corporation, the ambulance to be operated between Providence, Pawtucket, Fall River, Wallum Lake, etc., and to be housed



THE LEBARON C. COLT MEMORIAL AMBULANCE, in the garage at the factory

of the National company. This was believed to be a memorial which would serve a useful purpose and be far more highly appreciated than a tablet or a monument. The ambulance has just arrived and, as shown in the illustration, is of the latest design, being built expressly for the committee having the matter in charge. This committee consisted of George Schlosser, James W. Franklin, Frederick L. Dunbar, Wendell R. Davis, and Edward E. Bunn. The ambulance has a silver tablet bearing the following inscription: "In Memory of LeBaron Carleton Colt. Given by the People of Bristol, Rhode Island."

* * *

Pursuant to an agreement made between Jesse P. Walsh, manager of the American Wringer Co., and a committee of the employes who went out on strike about the middle of last month, the 600 employes of the company have returned to work. The agreement is for full time and a 20 per cent bonus, instead of a 10 per cent one under which the operatives had been working since the strike of a year ago.

Charles McGinley, of Woonsocket, who for the past six years has been employed at the American Wringer Co.'s plant in that city, has been appointed salesman of the mechanical roll department. He will have for his territory the southern part of New York State, all the States as far south as Georgia and as far west as Ohio, and also Texas.

The American Wringer Co. has had constructed a large garage of brick and wood in connection with its plant on Social street, Woonsocket.

The semi-annual convention of the sales force of the Davol Rubber Co. was held during the week of June 18 at the office in Providence. P. R. Wesley, general sales manager, was in charge of the meetings, which were full of interest and instruction to the salesmen. For entertainment the visitors were given the Rhode Island johnny cake and chicken dinner one day, a real Rhode Island clambake the next, and on the evening of the twenty-second, C. J. Davol, president and treasurer, gave a complimentary banquet to the sales force and heads of departments. During the informal talk following the banquet Mr. Davol stated that the past six months had been the most successful in the history of the company, which is now in its forty-third year, having been established in 1874 by Joseph Davol, father of the present president and treasurer.

*

The factory of the National India Rubber Co., at Bristol, in its shoemaking departments, will be closed down early in August, probably the eleventh, for the period of two weeks, for the purpose of taking the annual inventory of the stock on hand in raw material and manufactured products, and also to make an overhauling of machinery and equipment.

* * *

Thomas S. Walker, for several years connected with the Woonsocket Rubber Co., and later with the Lycoming Rubber Co., at Williamsport, Pennsylvania, has been transferred to St. Louis for organization work at the new factory of the United States Rubber Co. in that city.

HEWITT RUBBER CO. EXPANSION.

The Hewitt Rubber Co., Buffalo, New York, which has attained a high reputation for its manufactures of belting, hose, mechanicals and railway specialties, will add automobile tires to its line of products, and plans are well under way for the erection of a tire factory adjacent to its present plant, to have a capacity of 5,000 tires a day. It will increase its capital stock from \$500,000 to \$1,000,000.



J. H. KELLEY.

The general management of the business is now intrusted to the newly elected vice-president, John H. Kelley, who retired from the Republic Rubber Co., Youngstown, Ohio, after 14 years' service, to assume this position. Mr. Kelley is one of the best known tire men in the Middle West. For nine years he had charge of the Chicago branch of the Republic Rubber Co., and in 1912, on the death of Vice-President Lomasney, he became vice-president of the company.

Another notable addition to the management is F. V. Springer, who has also been made a vice-president. Mr. Springer was connected with the Republic Rubber Co. for over ten years, and held the important position of manager of sales of the railway department of that company. He will act as assistant to Mr. Kelley, and as special representative of the company.



F. V. SPRINGER.

H. H. Hewitt continues as president, and W. C. Mullett is secretary and treasurer. The acquisition of this group of experienced leaders naturally means a still further expansion of the company's business, in its present lines of manufacture, and a similar enterprise and activity in the new line of manufacture upon which it is entering.

The Rubber Trade in Great Britain.

By Our Regular Correspondent.

THERE is no particular change in the trade conditions which have prevailed for some time past, although restrictions on the imports of raw rubber have naturally lead to some anxiety among manufacturers. The restrictions mentioned for reducing the present tonnage shipped from the Far East will, of course, leave more of the commodity available for direct shipment to America, a situation which is viewed with more equanimity on this side now than would have been the case had not America abandoned her neutrality. Another matter which has come to a head recently and none too soon in the opinion of a considerable number of our rubber manufacturers, is the official prohibition of the importation of rubber goods except under Board of Trade license. Of course this is only a war measure, but it is very welcome to those who have strenuously advocated an import duty. Whether it will have the same effect remains to be seen, as it all depends on to what extent and for what goods the licenses to import are issued. As people do not renew their rubber sponges every week—if they use them at all—there will be no hardship to the community in stopping the importation of sponges for some time, especially as a large firm of retail druggists with branches all over the country announces that it has half a million to dispose of at the popular price of 6d. each. Moreover, satisfactory rubber sponges are now being made in large quantities at home. Whether they will be sold at the low figure of 6d. when the competitive article is disposed of is a matter for speculation.

Further extensions are about to be made to the buildings and plants of the Leyland & Birmingham Rubber Co., Limited, at Leyland, and in order to finance this the company is issuing to shareholders 18,500 6 per cent cumulative preferred shares of £1 each in the proportion of 6 for every 180 of ordinary or preferred shares held.

THE GOODRICH DE LUXE TRUCK TIRE.

By way of an addendum to a recent note on this subject, the main object of this tire is to decrease road vibration, and this has been successfully done by increasing the ordinary 2-inch thickness of available tread to 3½ inches, the greater thickness of rubber making the relative loss by wear less than in a 2-inch tread. The percentage is but slightly higher, but it is claimed that the user obtains more for his monetary outlay. Users of De Luxe tires are said to have obtained in some cases double and treble their former mileages. For example, on heavy dump trucks carrying 6½ to 8 tons, where regular tires have repeatedly failed at 3,000 to 5,000 miles, De Luxe tires have gone 9,000 miles and more.

THE LATE I. FRANKENBURG.

By the death on May 5, at the age of 71, of Alderman I. Frankenburg, the Borough of Salford has lost one of its foremost public men and the rubber trade of the Manchester district one of its best known representatives. Mr. Frankenburg, who was born in Russia, came to England when 12 years old and after some years in London moved to Manchester in 1868 and started the manufacture of leather bags, knapsacks, etc. He made his first thousand pounds, as he told his workpeople in after years, by getting through a contract very rapidly for the French in connection with knapsacks for the Franco-Prussian war of 1870. It was some years before the business which now included waterproof garment making was moved to the present site in Greengate, Salford. These premises were added to from time to time as the business progressed, new branches were added and at the present time they occupy a considerable area and give employment to over a thousand hands. The firm of I. Frankenburg & Sons, Limited, is a private limited company so there is no public quotation of the shares. Directorships in the company are held by one or two heads of departments who have

thus an additional interest in the progress of the concern. It was at these works where the late C. O. Weber commenced his work and researches into the character of rubber, his first modest laboratory being a year or two before his departure from the firm replaced by one of much greater dimensions and of correspondingly improved facilities. Of Mr. Frankenburg's public work much might be said, but space merely permits mention of the fact that he was mayor of Salford for four years and a benefactor of numerous local philanthropic institutions.

THE PRODUCTION OF ACETONE.

I notice a paragraph in the May issue of THE INDIA RUBBER WORLD relating to the production of acetone from the mahwa tree of Hyderabad. This paragraph, I may say, has in substance already appeared in our daily press, and unless I am hopelessly wrong it is assuredly very misleading. I do not believe that acetone occurs anywhere in nature and therefore I am much surprised to learn that it occurs in large quantities in the flowers of the above tree. There is no alcohol in potatoes or starch, though it can be obtained therefrom by fermentation or chemical reaction. Acetone is obtained commercially by the dry distillation of acetate of lime, a compound of lime and acetic acid obtained by distilling wood, the yield being 1 ton of acetone from 100 tons of wood. As the mahwa tree flowers are stated to contain ten times as much acetone as wood does, I take it that 100 tons of these flowers will yield in distillation acetic acid sufficient to yield 10 tons of acetone. Whether the Canadian producers of acetone are fearful of the forthcoming competition I cannot say, but it would seem, on the face of it, to be a big job to collect flowers by the hundred tons. As regards the use of acetone as a solvent in the rubber industry—apart from the laboratory—I imagine that this has been mainly in deresinating plants, and as it is now a common thing to read in rubber specifications that deresinated rubber is not to be used, it would seem that acetone will be in lessened request.

RUBBER PLASTIC FROM KELP?

The special article on the recently developed kelp industry of southern California in the May issue of THE INDIA RUBBER WORLD is of wide chemical interest at the present time and the article is well worthy of being read by a wide number of chemical technologists. As to the importance of the movement for obtaining potash from kelp or seaweed, as was done on a small scale for many years in Scotland, there is general agreement, though as regards the use of kelp as a prospective rubber plastic I am not alone in holding pessimistic views.

AUSTRALIA PROTESTS BRITISH AUTOMOBILE EMBARGO.

In connection with the proposed British order prohibiting the importation of motor cars, the Motor Traders of Australia has brought to the home government's attention the disastrous effect such prohibition would have in Australia. Without desiring to appear unpatriotic or to be of hindrance to the government's national policy, the committee has set forth a plain statement of facts showing that the interruption of transportation afforded by motor cars would be serious. As to the tire business, the report states that owing to the heavy fall in motor imports in the latter half of 1916 (commencement of 1917 fiscal year) and curtailment of miles run on the score of economy, the addition of an embargo would have a serious effect on the entire tire industry. Under normal conditions wages paid by tire manufacturers amount to \$120,000 per annum. The trade hopes that the government will not take such drastic action as to permanently damage the industry.

RUBBER GROWERS' ASSOCIATION.

W. O. Burt has been elected to fill the vacancy, as representative at The Hague of this association on the Executive Board of the International Association for Rubber Cultivation in the Netherlands Indies, caused by the death of C. A. Lampard.

The question of appointing official representatives of the Netherlands Indies Committee in Java and Sumatra and the interchange of ideas with such representatives is under consideration by the Rubber Growers' Association.

LIST OF BRITISH EMBARGOED RUBBER MATERIALS.

A PROCLAMATION, dated May 10, consolidates, amends and adds to, the list of goods which were prohibited to be exported from the United Kingdom to certain or all destinations by the Proclamation of May 10, 1916, as amended and added to by subsequent Orders of Council. The materials used in the rubber industry that were included in the list of prohibited exports are given below.

The prohibition of exports is as follows:

Goods marked (A), to all destinations.

Goods marked (B), to all ports and destinations abroad other than ports and destinations in British Possessions and Protectorates.

Goods marked (C), to all destinations in foreign countries in Europe and on the Mediterranean and Black Seas, other than France and French Possessions, Russia, Italy and Italian Possessions, Spain and Portugal, and to all ports in any such foreign countries, and to all Russian Baltic ports.

- (A) Acetic acid.
- (A) Acetones and their compounds and preparations.
- (B) Antimony, sulphides and oxides of.
- (C) Apparel, waterproof wearing, not otherwise specifically prohibited.
- (B) Asbestos and articles wholly or partly of asbestos.
- (C) Asphalt.
- (C) Asphalt, coal tar.
- (C) Balsams.
- (B) Barium sulphate.
- (B) Beeswax.
- (A) Benzol and its compounds and preparations.
- (C) Bitumen, liquid or solid.
- (C) Bone black.
- (C) Boots and shoes not otherwise prohibited.
- (B) Cables, insulated.
- (B) Cadmium, alloys of cadmium and cadmium ore.
- (A) Carbon disulphide.
- (A) Carbon gas.
- (B) Carbon tetrachloride and its preparations.
- (C) Clay, China, potters' and ball.
- (C) Cotton, all manufactures, mixtures, and products of, not otherwise specifically prohibited.
- (A) Cotton, Sea Island, yarn made from or containing.
- (A) Glycerin, and preparations containing glycerin not otherwise specifically prohibited.
- (B) Gums containing caoutchouc.
- (B) Hexamethylene tetramine (utropin) and its compounds and preparations.
- (C) Iron, oxides of.
- (A) Lead compounds, and mixtures containing lead compounds.
- (A) Magnesite, caustic or lightly calcined, and dead burnt magnesite.
- (B) Mica, mica splittings, mica powder, micanite, and articles made from and insulating materials containing them.
- (B) Motor spirit (except benzol).
- (B) Paraffin oil.
- (A) Paraffin wax.
- (B) Petroleum spirit and articles containing petroleum spirit.
- (B) Plumbago.
- (B) Resinous substances containing caoutchouc.
- (A) Rubber (raw, waste and reclaimed), solutions containing rubber, jellies containing rubber, and any other preparations containing rubber, and also balata, gutta percha, and the following varieties of rubber, viz.: Borneo, Guayule, Jelutong, Palembang, Pontianac, and all other substances containing caoutchouc.
- (B) Rubber, gutta percha or balata, goods made wholly or partly of.

- (B) Shellac.
- (A) Soda caustic.
- (A) Sulphur and preparations containing sulphur.
- (A) Sulphuric acid and mixtures containing sulphuric acid.
- (C) Talc, all forms, including French chalk.
- (A) Tar, coal.
- (B) Tar, vegetable.
- (B) Tar, wood.
- (B) Tires for motor vehicles and for cycles (whether attached to a vehicle or cycle or not), together with articles and materials especially adapted for use in the manufacture or repair of tires.
- (A) Toluol and its compounds and preparations.
- (B) Turpentine (oil and spirit), and articles containing turpentine.
- (C) Wax, carnauba.
- (B) Waxes, animal, mineral, vegetable, and composite waxes, not otherwise prohibited.
- (A) Xylol and its compounds and preparations.
- (A) Zinc oxide.
- (B) Zinc sulphide.

AMERICAN FLAG ON THE FRENCH GOODRICH FACTORY.

The B. F. Goodrich Co. has an extensive factory at Colombes, France, a picture of which is shown here. The workers at this factory sent an enthusiastic cablegram to their American co-workers recently. Translated it reads:



THE B. F. GOODRICH FACTORY AT COLOMBES, FRANCE.

With sincere and brotherly feeling, and from our heart, we salute the unsullied stars which shine today alongside our Tri-Color Flag in the sky of Liberty, Justice and Right. Bravo, comrades of Akron! Hurrah for President Wilson!

GOODRICH STAFF, COLOMBES, FRANCE.

A PERMANENT SAMPLES EXHIBITION AT LYONS, FRANCE.

The Lyons Fair Committee has decided to create a permanent Samples Exhibition at Lyons, combined with a Commercial Enquiry Office, in connection with the annual Fair. This permanent exhibition will consist of samples shown at the annual Fair and deposited by the exhibitor till the next Fair, when he can either replace the samples by others or leave them on view. It is hoped eventually to get together a large collection of samples, constituting a permanent industrial exhibition of great value. In order that no time may be lost in putting this scheme into execution, exhibitors at the 1917 Fair are being invited to support it at once.

THE BORDEAUX FAIR, 1917.

The second Bordeaux Commercial Fair will be held from September 1 to 15, 1917. It will be mainly a French Colonial Fair, but exhibits from allied and neutral countries will also be received. Applications for space should be addressed to *L'Administration de la Foire de Bordeaux*, Hotel de Ville, Bordeaux, France.

"Rubber Machinery." Mr. Pearson's newest book, filled with valuable information for rubber manufacturers, is now ready for mailing. Price, \$6.

Rubber Planting Notes.

JAPANESE RUBBER GROWERS IN MALAYA.

THE declaration of officials in the Federated Malay States that no persons other than natives, British and naturalized citizens will be allowed to lease State lands, is a severe blow to Japanese rubber growers in those territories. Japanese planters were exceedingly prosperous and owned rich plantations, the largest of which is capitalized at \$2,492,500 and has an area of 10,000 acres.

It is stated that the Kuhara Mining Co. intends to form a rubber company. The two companies will be separate, but the older one is to be the larger shareholder. Meanwhile, it seems that 2,560 acres of land in Borneo, planted with rubber trees of 1 to 5 years' growth, have already been acquired and that this holding will be enlarged.

GERMAN NEW GUINEA UNDER AUSTRALIAN DOMINATION.

Several years before the war broke out, German New Guinea was beginning to be a promising source of rubber and gutta percha. Under the Germans *Ficus* and *Castilloa* were being thrown out and *Hevea* and coconuts planted instead. Although no new rubber has been planted by the Australians, that existing is receiving attention so that the exports for August, 1915, were valued at 2,000 marks, an amount which increased to 22,898 marks in September. At present, tapping has been suspended and the trees allowed a period of rest.

The labor shortage, aggravated by inadequate shipping facilities and the prohibition of recruiting in certain districts, is viewed with considerable concern, but when it decreases the prospect for *Hevea* cultivation is thought to be good.

In general it is stated that Australia has taken up her task in a broad-minded manner and that the country is prospering. Shipping to and from Australia is frequent and regular, a radio-telegraph station has been installed at Rabaul, a sufficient circulation of money has been provided for and a branch of the Australian Commonwealth Bank has been established.

RUBBER IN BRITISH NEW GUINEA.

The Galley Reach Rubber Estates, Limited, in Papua, owns about 404 acres of cultivated land, half of which is covered with rubber seven years old and over. For the year 1916 the yield was 27,499 pounds, or 2.06 pounds per annum per tree in bearing. The total cost per pound of rubber is at present 42 cents (U. S. currency), but it is hoped to reduce this considerably when all the trees are in bearing. In spite of the high cost and the initial difficulties which young enterprises always experience, the company recorded a profit of £1,104 for the year, which is being carried forward. The crop for 1917 is estimated at 33,000 pounds, and the cost, f. o. b. Port Moresby, at 29 cents per pound.

RUBBER SAMPLES FROM NORTHERN NIGERIA.

The Imperial Institute, London, England, recently published the results of experiments with a sample of rubber produced in Northern Nigeria. The sample lost 26 per cent in weight after washing, due to the large amount of impurities. Analysis of the residue gave:

Caoutchouc	49.2 per cent
Resin	47.7 per cent
Proteins	2.4 per cent
Ash	0.7 per cent

The caoutchouc thus separated was almost black and its physical properties were poor. From the analysis it was concluded that the sample probably came from the *Ficus vogelii*. Samples of this rubber from Gambia and the Gold Coast had previously been tested at the Imperial Institute.

COCHIN CHINA RUBBER PRODUCTION IN 1916.

According to the *Annales des Planteurs de Caoutchouc de l'Indo-Chine*,^a the amount of plantation rubber exported from this French colony during the first eleven months of 1916 was 489,000 kilos [1,075,800 pounds]. The exports for the whole year may be assumed to have been 530,000 kilos [1,166,000 pounds]. The total for 1915 was 573,440 pounds.

INDO-CHINA TRADE BUREAU.

Before his departure from France, the new Governor of Indo-China, Albert Sarant, discussed with Colonial Secretary Doumergue plans for establishing an Indo-China trade bureau at Paris. Trade experts will be at the head of this bureau and their duty will consist in circulating throughout the French commercial and industrial world a knowledge of the natural resources and trade possibilities of Indo-China. Promotion of the plantation rubber industry figures largely in the plan. Large credits will be drawn for this purpose. The bureau will work along practical lines and be absolutely independent of the Colonial department.

THE NETHERLANDS RUBBER INDUSTRY.

The Amsterdam rubber market, normally important, suffered in 1916, when both imports and exports were prohibited. The prohibition on imports went into effect November 26, 1915, but shipments leaving the Dutch East Indies (which supply practically the whole market) prior to that date were admitted. Accurate figures of the stock on hand, imports and sales are not available, but it is said that the supply met the domestic demand, which is steadily increasing. Prices for *Hevea* Standard Crêpe No. 1, the principal grade, varied from \$0.80 to \$1.04 per one-half kilo [1.1 pounds].

The regulation prohibiting the export of rubber from the Netherlands became effective January 26, 1916. A few shipments to the United States, amounting to \$164,689, were permitted. The exports to that country were valued at \$98,960 in 1915, and at \$534,805 in 1914. It is claimed that 1916 shipments would have been much larger but for the high quotations. American importers preferred to place their orders at the London and Dutch colonial markets, obtaining more favorable prices. Amsterdam brokers say that after the war it will require strong and united efforts to regain the trade of the American market, practically lost through existing circumstances.

Various new rubber factories that are likely to be permanent have been established in Amsterdam and vicinity as a direct result of reduced imports. Among them is a company producing rubber raincoats, other waterproof garments and various kinds of clothing.

NETHERLANDS PLANTATION COMPANIES MOVE.

The following plantation companies have recently moved their offices at The Hague from Kneuterdijk 13 to Bezuidenhout 11, 'S-Gravenhage: Vereenigde Indische Cultuur-Ondernemingen (United Indian Plantations); Nederlandsche Oliepalmen Cultuur-Onderneming (Netherlands Oil Palm Plantations), and Maatschappij Voor Koloniale Ondernemingen (Colonial Plantations Co.)

NETHERLANDS STATISTICAL TAX ON IMPORTS AND EXPORTS.

A statistical tax at the rate of one-tenth per cent ad valorem is now leviable on all goods imported into, or exported from, the Netherlands, in order to defray the expenses connected with a bureau which has been established to compile customs and other national statistics.

BRADFORD ESTABLISHES OFFICE IN PENANG

R. F. Bradford has opened an office in the F. M. S. Railway building at Penang, as general representative in the East of Aldens' Successors, Limited, of London, Liverpool and New York City. The business will be carried on under his own name. Rubber will be the principal commodity dealt in, later other lines of tropical production will probably be included.

THE RUBBER INDUSTRY OF BOLIVIA.

The June issue of the "Pan-American Magazine" is devoted to several articles on Bolivia, a country whose alignment with the United States in the world war stimulates the interest which her developing wealth has aroused during recent years. For years the country has had a favorable trade balance which in 1915 amounted to almost \$30,000,000, chiefly in minerals, although rubber is the principal vegetable product, the 1915 exports of which amounted to 5,081 tons, making Bolivia the second rubber exporting country of South America. All came to the United States except the 341 tons taken by Great Britain.

Bolivian producers in every line are shown to be very prosperous and this is true of the rubber industry, which has benefited greatly as a result of the Madeira-Mamore railroad, completed in 1912, and the improved facilities at Porto Velho on the Madeira river. Interesting facts are included regarding the colonization and development of the 132,000 acres, owned by the Bolivia-Brazil Rubber and Timber Corporation, of which a group of New Jersey men and one Bolivian are officials, Dr. Samuel T. Busey being managing director.

PLANTATION RUBBER IN DUTCH GUIANA.

FUTURE PROSPECTS ENCOURAGING.

UP to the present, apart from the leaf disease which has been epidemic for some time but now seems to be abating, everything points to the fact that rubber growing as a commercial undertaking should be a success.

The rate of growth of the trees in this colony has been satisfactory, and, so far as data can be obtained at this early period, the yield per acre has been quite normal. In some instances it has been above the average. The cost of collecting the latex in some districts has been seven cents per pound of dry rubber. This, possibly, may not be the case when tapping operations have to be carried out on a large scale, and one has to utilize what labor there may be available in the district. It is generally considered that an estate of 300 acres would require about 100 tappers, or one laborer to three acres. This labor force will be required for only about one-third of the day, the remaining two-thirds being devoted to the usual routine of estate work. But it must not be forgotten that, as the trees increase in size, so they increase in the spread of their branches until they so shade the ground that little weeding is actually required. The planter, therefore, will be face to face with the difficulty of disposing of his labor force after tapping has been finished. This is an important feature. If land is available then there is the opportunity of giving out land for the laborers to cultivate in ground provisions, bananas, etc., and, if suitable areas are contiguous, rice planting can be included. The difficulty is a very practical one, as the tapping gangs must be kept on the spot.

If there should be no land adjacent for the laborers to take up, the difficulty of employing a large force can hardly be overcome. It must be borne in mind that in the East it is usual to count the cost of collecting the latex as one-half the total cost of production.

We have, therefore, cause for great hope of the rubber industry, even if the price of rubber should be only 48 cents per pound. Mr. Bancroft, of British Guiana, suggested that the cost of tapping and collecting might be 15 cents per pound, and

the yield that might be expected from trees in full bearing be estimated at 300 pounds per acre, i. e., with rubber at 48 cents per pound, \$144 per acre per annum. As against this, the cost of tapping at 15 cents per pound of dry rubber would amount to \$45 per acre. Taking the experience of the East, that the cost of tapping is half the total expense, we should have an expenditure of \$90, leaving \$54 per acre as a profit. These figures would apply, of course, to an estate in full bearing where very little expenditure for weeding would be necessary. It would seem, therefore, that with rubber at only 48 cents per pound the future may be regarded with some degree of confidence.

MORE SPRAYING NEEDED.

Spraying is a much neglected art in this colony. Even those growers who practice it generally do so in the belief that it may be so much money thrown away. Others practice this method of control merely because they have been compelled to do so by their proprietors, whom, they believe, are all wrong, being guided by scientific men who know really nothing practical about tropical agriculture. The position taken is not unlike that of old sugar planters. When such men as Professor Harrison and Mr. Jenman, both of British Guiana, proclaimed the possibilities of seedling canes, the practical planters in that colony at first would have nothing to do with them; it was the absentee proprietor who forced these canes upon them and who first acknowledged the importance of the work done at the seedling station in Georgetown. The old planters cursed the seedling, but with much grumbling, and still more reluctance, obeyed the instructions of their proprietors. The wisdom of the proprietors to-day speaks for itself in no uncertain voice.

So, too, with spraying. Strong prejudice exists against it, and spraying outfits are often entirely absent on even fairly large estates. Because many planters know nothing about the subject they get no results and jump to the conclusion that all spraying is a fraud. A case in point is the leaf disease of *Hevea Brasiliensis*. Mr. Bancroft has carefully worked out a treatment for this disease and he tells the planter how to spray, what to spray with, and when and how often to apply the application. The planter makes his mixture, possibly makes it incorrectly; he applies it in the wrong way and at the wrong time, and he gets no results. At once he concludes that spraying is useless, that all these scientific instruments only cost money for no purpose, and he condemns in no uncertain terms a system of which he is really entirely ignorant.

It will be seen, therefore, that the whole question of spraying is intimately wrapped up with not only the intelligence of the grower, but his knowledge of certain plant life, and special knowledge sometimes is more than desirable—it is a necessity. In the hands of an ignorant grower spraying may degenerate into a useless and expensive method; in the hands of the man who knows what he is doing it is a most valuable aid to successful rubber growing.

RUBBER EXPORTS FROM ECUADOR.

The exports of rubber for the year 1915 showed a considerable increase over those for 1914, due chiefly to the higher prices paid.

The following figures give the amounts for both years and the countries of destination:

	1914.	1915.
Great Britain	211	708
Germany	46,311	.....
United States	283,413	563,950
Totals	323,935	563,758

Semi-official reports state that 132,000 pounds of crude rubber were exported from the port of Guayaquil during 1916.

BRAZILIAN RUBBER NOTES.

By a Special Correspondent.

THE *Sociedade Nacional de Agricultura*, Rio de Janeiro, lately held a solemn reunion in celebration of the completion of the twentieth year of its existence. José Bezerra, Minister of Agriculture, presided; Lauro Müller, ex-Minister for Foreign Affairs, and the Minister of Chile were among the prominent persons who attended.

This oldest and most important of Brazilian institutions has been untiring in its efforts towards improving and advancing agriculture in Brazil. As a result of its activities, the First and Second Agricultural Congresses were organized and the seeds sown on these occasions bore rich fruit—the creation of the Department of Agriculture, Industry and Commerce. If exhibitions were to be held, the Society was ever ready to take up their management; besides this it constantly arranged for the giving of a series of lectures concerning economic problems.

Through its organ, *A Lavoura*, it circulated propaganda for agricultural matters, and published and distributed articles and works containing much valuable information and advice.

Among its activities for the past year may be mentioned the following points presented for consideration to the Governor and National Congress:

1. Distribution of cotton seed on a large scale and encouragement of cotton culture.
2. Institution of free markets and assistance for those existing.
3. Protection of cotton and study of its diseases and pests, particularly of the Pink Boll Worm.

The list of its members is constantly growing and at present numbers about 6,000 persons.

A CONFERENCE TO PROMOTE RUBBER INTERESTS.

Recently a special commission from Amazonas visited Para with the object of establishing measures for the improvement of commercial relations between the two states.

At the reception held by the *Associação Commercial do Para* and presided over by Dr. Lauro Sodré, Governor of the State of Para, the representatives from Amazonas discussed the question of transport, which has been crippling Amazonian commerce, and pointed out the necessity of steamers putting in at Manaus on their way from Belem to Acre, and *vice versa*. The *Associação* stated that the difficulty lay with the Captain of the Port of Manaus, who persisted in a policy of molestation and persecution toward Para-Acre vessels, and, therefore, proposed that the Silveiro-Enéas law should be abolished, to which the mission replied that the Government of Amazonas would do all in its power to remove the difficulties. Concerning the abolition of the law, however, they recommended that the Governor of Para communicate with the Governor of Amazonas.

The *Associação* also submitted to the special consideration of the heads of both states the following points:

- (1). The organization of co-operative enterprises, one in Para and another in Manaus, for undertaking intensive cultivation of *Hevea* and other cultures in regions near these capitals, the cost of production being thus considerably reduced and the returns proportionately increased.
- (2). Obtaining preferential tariff for manufactures from superior qualities of rubber and an increased duty on articles made of reclaimed rubber or substitutes—a means of encouraging the consumption of good rubber—advancing the valorization and protecting factories where the better kind of rubber is used.
- (3). Inducing the municipalities of the country to enact laws to enforce in electric installations the use of insulated wires of at least 2,500 megohms—thereby necessitating the employment of good rubber.
- (4). Organizing, on an equal basis, an enterprise, directed by the commercial associations of Para and Manaus and under the

supervision of the two governments, to circulate propaganda for rubber in the centers of consumption, representing to industrialists the advantages of utilizing the protection offered by Amazonian tariff, the costs of this enterprise to be covered by the receipts from a tax of 1 per cent on the valorization, to be levied by the Congresses of Para, Amazonas, and, if possible, by Matto-Grosso and Federal.

IS THIS NEUTRALITY?

As the *Lloyd Brasileiro* is controlled by the Treasury and, therefore, practically a government department, the preference shown to German shippers at this time is especially incongruous.

Of the 13,098 tons of rubber shipped from Manaus from January 1 to March 30 of the current year to all destinations, 7,298 tons or 55.7 per cent were shipped by Allied and American firms, 4,951 tons or 37.8 per cent by Brazilian and Portuguese firms and only 849 tons or 6.5 per cent by German.

In spite, however, of the enormous disproportion between shipments by Germany and those by Allied and Brazilian firms, out of the total space available in *Lloyd Brasileiro* boats, 47.9 per cent was allotted to Germans, 25 per cent to Brazilian, 17.7 per cent to American—the largest shippers of all—and only 9.4 per cent to all Allied firms, British, French and Italian!

It is hoped that when the Ministry of Finance or of Foreign Affairs is informed of this favoritism, the situation will promptly be altered.

AN EXPERIMENT STATION FOR *HEVEA* CULTIVATION.

The *Club da Seringueira* has recently commenced operations at the *Campo de Experiências da Sociedade Amazonense de Agricultura*. This station had been given over to the government three years ago and all work there was suspended. Dr. Angelino Bevilacqua is the new director, while Colonel Raymundo C. Monteiro da Costa has been entrusted with the task of procuring good seed. The undertaking is financially aided by the government of the State of Amazonas.

Work is now proceeding regularly; *Heveas* have been planted in certain parts of the estate and nursery beds laid out. From April 2 to 24 not less than 42,000 seeds were gratuitously distributed.

THE BALATA INDUSTRY IN SURINAM.

The balata industry during 1916 seems to have been satisfactory. Recent registrations for balata concessions in Paramaribo also indicate a certain amount of activity.

The exports for the year amounted to 2,005,278 pounds, which compares the more favorably with the British Guiana figures of 1,450,702 pounds, because labor in Surinam is scarce, while the neighboring colony can command sufficient men to meet its needs. About 253 tons of balata, representing a value of about \$300,000, arrived in Nickerie during the past year.

The balata production for the last six years was: 1911, 1,146 tons; 1912, 727 tons; 1913, 1,086 tons; 1914, 1,086 tons; 1915, 209 tons; 1916, 769 tons.

The recovery of this industry during the last year has naturally been greeted with much satisfaction, especially because of its influence on the general business tone in the colony. However, the labor situation, which is becoming acute, is causing considerable anxiety, as does the shipping question, making it difficult for merchants to send their products to the highest bidders.

EXPORT DUTY ON YAVARI RUBBER.

A Peruvian Presidential Decree of December 27, 1916, provides that the duties (2, 4 and 6 per cent) imposed by a decree dated July 12, 1916, are to be levied on the market prices of rubber from the Yavari. By this new decree the reduction of 30 per cent from the current prices allowed on rubber from the Madre de Dios is not to be allowed for rubber from the Yavari.

Recent Patents Relating to Rubber.

THE UNITED STATES.

ISSUED MAY 15, 1917.

- N** 1,225,910. Tire valve unseating device. W. A. Williams, Barton, Ohio. Rubber hose and its attachment and detachment to and from wheels. E. B. Killen, London, England.
- 1,226,110. Airless tire. L. H. Patterson, Portland, Oreg.
- 1,226,148. Diving dress. F. H. Walters, Auckland, New Zealand.
- 1,226,247. Rubber tread surface for boots. J. D. Prince, New York City.
- 1,226,254. Non-skid tire. A. Rich, Stamford, Conn.
- 1,226,270. Tire clamp. L. E. Snivley, Jr., Glenside, Pa.
- 1,226,271. Tab end for garters. H. J. Stuart, assignor to The Robert N. Bassett Co.—both of Derby, Conn.
- 1,226,304. Water bag stopper. H. V. Brumley, Plandome, assignor to Whitall Tatum Co.—both of New York City.
- 1,226,318. Rubber-soled canvas shoe. E. W. Dunbar, assignor to Apsley Rubber Co.—both of Hudson, Mass.
- 1,226,320. Tire chain. T. V. Elliot, New York—assignor to Elliot Rim Chain & Tread Corp., Esopus—both in New York.
- 1,226,358. Tire tread. Mabelle Nace, Piedmont, Calif.
- 1,226,563. Tire valve. H. F. Miller, Rushville, Nebr.
- 1,226,580. Tire. E. J. Oetter, Denver, Colo.
- 1,226,596. Pressure bag for vulcanizing purposes. H. E. Rasmussen, Fitchburg, Mass.

ISSUED MAY 22, 1917.

- 1,226,664. Tire valve. W. R. Hose, New Ulm, Minn.
- 1,226,702. Vacuum massage device. J. G. Schlenker, Toledo, Ohio.
- 1,226,703. Pneumatic tire. K. H. Schmidt, Chicago, Ill.
- 1,226,862. Antislipping device for armored pneumatic tire. C. L. Crow, Alexander City, Ala.
- 1,226,899. Tire filler comprising a circumscribing strip and resilient disks through which the strip passes. L. McKinnon, Salt Lake City, Utah.
- 1,226,909. Blowout patch. B. H. Pratt, Milwaukee, assignor to The Federal Rubber Co., Cudahy—both in Wisconsin.
- 1,226,984. Rubber covered roller. J. Muskett, Pendleton, Manchester, England.
- 1,227,011. Tire rim detach. T. R. Snyder, assignor of one-fourth to W. H. Werley—both of Barberton, Ohio.
- 1,227,108. Inner tube for pneumatic tires. H. C. Boggs, Decatur, Ala.
- 1,227,239. Protecting lining for pneumatic tire. Bertha Mermelstein, New York City.
- 1,227,422. Core for resilient wheel tires. G. E. Gilmore, Cleveland, and V. F. Roessel, Akron—both in Ohio.
- 1,227,426. Tire casing. H. E. Grabau, Long Island City, and A. C. Schwartz, New York City—both in New York; said Grabau assignor to said Schwartz.
- 1,227,493. Resilient heel for boots or shoes. A. L. Runyan, Waterloo, Iowa, assignor to Runyan Cushion Wheel Co., Omaha, Nebr.
- 1,227,494. Resilient wheel. A. L. Runyan, Waterloo, Iowa, assignor to Runyan Cushion Wheel Co., Omaha, Nebr.
- 1,227,495. Resilient tire. A. L. Runyan, Waterloo, Iowa, assignor to Runyan Cushion Wheel Co., Omaha, Nebr.
- 1,230,075. Demountable rim. L. H. Perlman, New York City.

ISSUED MAY 29, 1917.

- 1,227,563. Pressure gage attachment. W. A. Allen, Yonkers, assignor to A. Schrader's Son, Inc., Brooklyn—both in New York.
- 1,227,673. Armored liner for pneumatic tires. S. A. Ruse, Chicago, Ill.
- 1,227,690. Hose. L. A. Subers, Cleveland, Ohio.
- 1,227,791. Tire for vehicles and method of making the same. J. Huebner, assignor to Pan-American Rubber Co.—both of Milwaukee, Wis.
- 1,227,925. Demountable rim for pneumatic tire. E. Oliver, Dayton, Fla.
- 1,227,990. Demountable rim wheel. E. K. Baker, assignor to Universal Rim Co.—both of Chicago, Ill.
- 1,228,001. Rubber tire casing having corrugated metallic armor plate embedded therein. D. J. Demar, Pittsburgh, Pa.
- 1,228,071. Inner tube comprising a plurality of inflatable sections, and an air distributing tube extending through them. J. F. Sincage, Florence, Mass.
- 1,228,140. Rubber bottle-washing brush. M. C. Rosenfeld, Boston, Mass.
- 1,228,246. Demountable rim. J. D. Reilly, Providence, R. I.
- 1,228,346. Removable resilient core for tires. J. W. Moakles, assignor of one-half to N. S. Wright—both of East Worcester, N. Y.
- 1,228,355. Vehicle tire jacket. A. S. Anderson, assignor of one-half to R. L. Smith—both of Oakland, Calif.

ISSUED JUNE 5, 1917.

- 1,228,397. Canvas hose coupling. N. B. Braly, Butte, Mont.
- 1,228,447. Tire shield. L. Koenig, New York City.

- 1,228,528. Luminated power transmission belt. M. D. Campbell, assignor to The Perkins Campbell Co.—both of Cincinnati, Ohio.
- 1,228,532. Vocal flute constructed in a single piece from rubber. A. V. Chevers, East Providence, R. I.
- 1,228,539. Resilient tire. J. V. Dewald, Philadelphia, Pa.
- 1,228,630. Tire body construction. P. E. Wirt, Bloomburg, Pa.
- 1,228,650. Protected tire. J. H. Christian, Detroit, Mich., assignor to Perfection Tire & Rubber Co., a corporation of South Dakota.
- 1,228,783. Air mattress. G. E. Kerivan, Newton, Mass.
- 1,228,795. Means for holding demountable rims on wheels. S. R. McKay, assignor to The McKay Co.—both of Cleveland, Ohio.
- 1,228,796. Rim-clamping device. S. R. McKay, assignor to The McKay Co.—both of Cleveland, Ohio.
- 1,228,808. Corset having elastic strips. M. G. Motz, Hillsdale, N. J.
- 1,228,884. Rubber boot with side-pocket lace. J. T. Crowley, assignor to The Beacon Falls Rubber Shoe Co.—both of Beacon Falls, Conn.
- 1,228,914. Inflatable apparatus for raising sunken ships. E. S. Hayford, New Orleans, La.
- 1,228,941. Demountable rim. E. R. Maurer, Detroit, Mich.
- 1,228,970. Wheel rim. James T. Donald, Seattle, Wash.
- 1,229,050. Respirator. R. Donald, London, England.
- 1,229,096. Reinforcing device for pneumatic tires. E. J. Kries, Mendota, Ill.
- 1,229,104. Tire protector. L. H. Lloyd, Bloomington, Ill.
- 1,229,166. Resilient tire. S. Suss, New York City.
- 1,229,245. Fire-hose valve. W. H. Eddy, Superior, Wis.
- 1,229,264. Pneumatic tire. V. Hensley, Vallejo, Calif.
- 1,229,270. Waterproof cloak. F. W. Howard, New York City.
- 1,229,423. Drainage appliance. E. G. Eckenrode, Baltimore, Md.
- 1,229,581. Means for attaching a resilient cushion to a rigid base. R. Butler, Boston, Mass.
- 1,229,639. Demountable and separable vehicle-wheel rim. H. Mote, Cleveland, Ohio.
- 1,229,734. Means to deflate inner tubes. H. N. Eversole, H. R. Cawthon, and H. I. Owen, Fulton, Mo., said Cawthon and said Owen assignors to said H. N. Eversole and F. R. Eversole, St. Louis, Mo.
- 1,229,794. Illuminated toy balloon and lighting effect. A. Salzer, New York City.
- 1,229,801. Demountable rim for vehicle-wheels. A. H. Smith, New York City.
- 1,229,861. Puncture-proof pneumatic tire. G. Auberlin, Vallejo, Calif.
- 1,229,947. Athlete's guard comprising elastic adjusting straps. F. Haggerty, assignor of one-fourth to C. Izenstark—both of Chicago, Ill.
- 1,230,007. Rubber-lined combination valve and hose connection. F. Milliken, Lawrence, N. Y.
- 1,230,019. Hose-band. O. W. Patton, Los Angeles, Calif.
- 1,230,025. Pneumatic belt and back and shoulder pads for use in carrying personal equipment. J. A. Pugh, Cardiff, Wales.
- 1,230,071. Pneumatic tire alarm device. L. E. Hawk, assignor of one-third to E. R. Kilpatrick—both of Chicago, Ill.
- 1,230,075. Demountable rim. L. H. Perlman, New York City.

THE UNITED KINGDOM.

ISSUED MAY, 9, 1917.

- 102,039. Spout for collecting rubber latex from trees. J. H. Beaufort, British North Borneo.
- 104,484. A clip for securing a rubber tube to a metal pipe. A. G. Elliott and Rolls-Royce, Limited, Nightingale Road, Derby.
- 104,529. Tire patch. C. L. Cuthbe and E. D. Burley (trading as C. L. Cuthbe & Co.), 37 Great Eastern street, London.
- 104,536. Soft india rubber slipper for insertion between a porcelain tooth and the dental plate. E. R. Magnus, 175 Macquarie street, Sydney, New South Wales, Australia.
- 104,615. Rubber corn shields. C. W. Doubleday, 141 Maple street, Ashland, Ohio, U. S. A.
- 104,616. Combination leather and rubber shoe sole. F. Marsh, 77 Cross Green Lane, Leeds.
- 104,820. Rubber-soled shoes. W. J. Jackson, Mellersh, 28 Southampton Buildings, London. (National India Rubber Co., Wood street, Bristol, Rhode Island, U. S. A.)
- 104,868. Diving apparatus. Dragerwerk, H. & B. Drager, 53 Moislinger Allee, Lübeck, Germany.

ISSUED MAY 16, 1917.

- 104,891. Means for automatically distributing the load to motor car wheels. W. T. Carling, Tangley, Sydney Road, Guildford.
- 104,903. Sewing machine presser foot comprising a rubber ring. L. R. Jenkintown, Pennsylvania, U. S. A.
- 104,926. Pneumatic tire pressure gage. E. C. R. Marks, 57 Lincoln's Inn Fields, London. (Vancouver Motor Supplies, 827 Hastings street west, Vancouver, British Columbia, Canada.)
- 104,980. Fountain pens. W. I. Ferris, 525 Lawrence avenue, Westfield, New Jersey, U. S. A.

- 104,987. Inflatable life-saving garment. H. Swinbourne, 8 Duke street, Hoxley near Barnsley, Yorkshire, and G. H. Webster, 64 Cumberland street, North Road, Darlington.
- 104,990. Salt rubber suction base for boxer dentures. A. W. Fisher, Bryn Estyn, Whitchurch, Salop.
- 104,997. Tire attachments to rims. G. S. Warrin, Abbey Lane, Stratford, Essex.
- 105,038. Surgical drainage appliance of rubber. I. A. Liddell, 358 High Road, Lee, Kent.
- ISSUED MAY 23, 1917.
- 105,126. Elastic tires. J. F. van der Velde, 12d Bezuidenhout street, Troyeville, Johannesburg.
- 105,159. Drain plug comprising a rubber ring. J. Heath, Manor avenue, Urmston, near Manchester.
- 105,169. Soothing teats. W. T. Rae, 2 Royal Terrace, Springburn, Glasgow.
- 105,214. Sleeves of coats and waterproof garments. B. M. Chambers, H. M. S. Impériouse, care of General Post Office, London.
- 105,215. Couplings for rubber or like hose. J. J. Purdie, Dunavon, Lansdown Road, Sidcup, and Leyland & Birmingham Rubber Co., Golden Hill Works, Leyland, Lancashire.
- 105,226. Printing surfaces made by pressing plates of plastic material, such as rubber, on to a matrix. H. Blucher, 1 Kanalstrasse, Gohlis, Leipzig, and E. Krause, 6 Sedanstrasse, Steglitz, Berlin, both in Germany.
- 105,229. Dust caps for tire valves. A. Schrader's Son, 783 Atlantic avenue, Brooklyn, New York, assignee of M. C. Schweinert, 226 Palisade avenue, West Hoboken, and J. Volckhausen, 54 Fulton street, Weehawken—both in New Jersey.
- 105,238. Protected pneumatic tire. R. de Prandieres, 2 Rue Duquesne, Lyons, France.
- 105,260. Patch for repairing tire tubes. W. C. Sneyd, 144 Broad Street, Pendleton, and H. E. Young, 32 Broadway, Withington—both in Manchester.
- 105,293. Artificial foot having rubber cushion. C. Salmon, 55 Drayton Park, Highbury, London.
- 100,498. The word DRIDEK—waterproofed textile fabrics for tops, curtains, and upholstery for automobiles and other motor vehicles. L. J. Mutty Co., Boston, Mass.
- 101,216. Design of four-leaved clover within a square frame—men's rain-coats. Roger Bros., Chicago, Ill.
- 101,255. The words GOOD AS WHEAT—rubber tires. Converse Rubber Shoe Co., Malden, Mass.
- 102,191. The word CUPID—chewing-gum. Love-Me-Gum Co., Baltimore, Md.
- 102,503. The words THE BOOTERY—boots, shoes, and slippers made of leather, rubber or canvas. C. H. Wolfelt Co., Los Angeles, Calif.
- 102,983. The compound word EX-O-DENT—chewing-gum. Detroit Dental Manufacturing Co., Detroit, Mich.
- 103,067. Design of leaves and blossom with letter C in center—chewing-gum. Independent Gum Co., Kansas City, Mo.
- 103,098. Horizontal design of leaves and blossom with letter C in center—chewing-gum. Independent Gum Co., Kansas City, Mo.
- 103,099. Perpendicular design of leaves and blossom with letter C extending above it—chewing gum. Independent Gum Co., Kansas City, Mo.
- 103,182. The word TUXEDO—suspenders. Pioneer Suspender Co., Philadelphia, Pa.
- 92,831. The word SEACO—hot water bottles, syringes, ice caps, invalid rings, surgical rubber gloves, breast pumps, and atomizers. Geo. L. Clafin Co., Providence, R. I.
- 97,449. The word WEAREVER—household rubber gloves. The Faultless Rubber Co., Ashland, Ohio.
- 102,569. Six-pointed design within a circle—rubber tires. The Miller Rubber Co., South Akron, Ohio.
- 102,676. The words JUICY FRUIT within a design—chewing gum. Wm. Wrigley, Jr., Co., Chicago, Ill.
- 102,718. The words FIRST STEP—leather, rubber and canvas shoes. Mrs. A. R. King, Inc., Philadelphia, Pa.
- 103,069. The word SUPERBAR—rubber tires. Rubber Insulated Metals Corp., Richmond, Va., and Plainfield, N. J.
- 103,461. The word BEACON—rubber heels and rubber soles. Beacon Rubber Co., Lynn, Mass.
- 84,473. Representation of an athlete—boots and shoes made partly or wholly of rubber, namely, rubber-soled shoes with canvas uppers vulcanized or cemented thereon. The Beacon Falls Rubber Shoe Co., Beacon Falls, Conn., assignor to The Beacon Falls Rubber Shoe Co., Boston, Mass.
- 84,474. The word MARATHON—boots and shoes made partly or wholly of rubber, namely, rubber-soled shoes with canvas uppers vulcanized or cemented thereon. The Beacon Falls Rubber Shoe Co., Beacon Falls, Conn., assignor to The Beacon Falls Rubber Shoe Co., Boston, Mass.
- 101,422. The word ZEPHYR—play-balls. The Gregory Rubber Co., Akron, Ohio.
- 102,518. The words SILVER KING BLACK LINE—golf-balls. The India Rubber, Gutta Percha & Telegraph Works Co., Limited, London, England.
- 102,519. The words SILVER KING RED LINE—golf-balls. The India Rubber, Gutta Percha & Telegraph Works Co., Limited, London, England.
- 102,520. The words SILVER KING GREEN LINE—golf-balls. The India Rubber, Gutta Percha & Telegraph Works Co., Limited, London, England.
- 102,521. The words SILVER KING YELLOW LINE—golf-balls. The India Rubber, Gutta Percha & Telegraph Works Co., Limited, London, England.
- 102,687. The letter M within a shield design—floor-gaskets, siphon-valve washers, fuller balls, valve-disks, and glass-gage washers made of rubber or rubber and fabric. The Mechanical Rubber Co., New York City.
- 103,015. The word INDESTRUCTIENE—rubber belting, rubber water-hose, garden-hose, cotton rubber-lined milled hose, cotton rubber-lined fire-hose, rubber fire-hose, steam-hose, brewers' hose, oil-hose, air-hose, acid-hose, sand-blast hose, suction-hose, dredging-sleeves, sheet-rubber packing, and rubber gaskets. The Combination Rubber Manufacturing Co., Bloomfield, N. J.

THE DOMINION OF CANADA.

ISSUED FEBRUARY 28, 1917.

- 174,865. Rubber soled shoe. L. C. Colt, Bristol, Rhode Island, U. S. A.
- 174,880. Inner tire. J. H. Grube, Los Angeles, California, U. S. A.
- 174,926. Non-skid tire. A. Rich, Stamford, Connecticut, U. S. A.
- 174,932. Protector for pneumatic tires. J. W. Smith, Nooksack, Washington, U. S. A.
- 174,993. Teat cup. H. W. Terry and J. W. Fowler—both of Toronto, Ontario.
- 175,003. Canvas hose coupling. N. B. Braly, Butte, Montana, U. S. A.
- 175,027. Teat cup for milking machines. L. Dinesen, Minneapolis, Minnesota, U. S. A.
- 175,044. Inflatable life saving belt. T. Ingaramo, Genoa, Italy.
- 175,144. Nursing bottle and nipple. H. H. Baker, assignee of R. R. Baker—both of Buffalo, New York, U. S. A.
- 175,352. Automobile tire. I. Normandy, St. Catharines, Ontario.

THE FRENCH REPUBLIC.

PATENTS ISSUED (WITH DATES OF APPLICATION.)

- 482,308 (July 21, 1916). Rubber cushion wheel. G. Costantin.
- 482,367 (July 26, 1916). Improvements in pneumatic tires. H. Brown.
- 482,373 (September 3, 1915). Pneumatic metallic wheel for automobile and other vehicles. C. Longest (Sr.).
- 482,519 (August 8, 1916). Double inner tube. N. C. Doss.
- 482,609 (August 21, 1916). Pneumatic tire. A. Baigné.
- 482,615 (August 21, 1916). Method of fitting solid tires to the rims of wheels. C. Videcoq.
- 482,620 (August 21, 1916). Improvements in rims and tires for wheels. H. Raflovich.
- 482,660 (August 26, 1916). Elastic wheel for vehicles. C. Weber and M. W. Gerth.
- 482,682 (August 28, 1916). Improvements in tires for wheels of vehicles, automobiles and others. A. A. Crozier.
- 482,683 (August 28, 1916). Tire for wheels of carriages, automobiles and others. A. A. Crozier.

TRADE-MARKS

THE UNITED STATES.

- 100,614. Representation of sticks forming the word STYX—rubber patch for repairing inner tubes of automobile tires. H. E. Dickard, Monroe, La.
- 101,259. The word FAPNUM intertwining a curved dagger—men's, women's and children's shoes made of rubber and other materials. Churchill & Alden Co., Brockton, Mass.
- 101,394. Representation of a section of belting with a blue stripe through the center—rubber belting. The Goodyear Tire & Rubber Co., Akron, Ohio.
- 101,470. The word YUCATAN—chewing gum. American Chicle Co., New York City.
- 101,779. The word CERVANTES—fountain pens. Celestino Fernandez & Sons, New York City.
- 102,074. The word SCOTTIE—golf-balls, golf-clubs and golf-bags. Wm. Filene's Sons Co., Boston, Mass.
- 102,248. The word SQUARE above the word DEAL—rubber bands. Goodyear Rubber Co., St. Paul, Minn.
- 102,455. The compound word BEE-GE-BOO—balloons. The Miller Rubber Co., Akron, Ohio.
- 86,469. The word CHEF and below it a representation of a French cook—chewing-gum. Berdan & Co., Toledo, Ohio.
- 99,858. Representation of a man's foot in the act of walking, displaying heel—rubber heels for boots and shoes. O'Sullivan Rubber Co., Portland, Me., and New York City.

THE UNITED KINGDOM.

- 376,925. The word BELDAMITE—compositions for preventing the radiation of heat. The Beldam Packing & Rubber Co., Limited, 29 Gracechurch street, London, E.C.3.
- 376,331. The word MULTIBESTOS—all goods included in class 40. Standard Woven Fabric Co., South street, Walpole, Massachusetts, U. S. A. United Kingdom address, care of Marks & Clerk, 57 and 58 Lincoln's Inn Fields, London, W.C.
- 377,518. The word MAXIMILE—all goods included in class 40. Redfern's Rubber Works, Limited, Dawson street and Spring Bank street, Hyde, Cheshire; and 10 Gresham street, London, E.C.2.
- 376,752. The word IRIS—india rubber teats for feeding bottles, sold separately, i. e., apart from the bottles themselves. J. G. Franklin & Sons, Limited, 17 Colveston Crescent, Dalston, London, E.8.
- 376,926. The word BELDAMITE—raw or partly prepared vegetable, animal, and mineral substances used in manufacture not included in other classes. The Beldam Packing & Rubber Co., Limited, 29 Gracechurch street, London, E.C.3.
- 376,935. The word BELDAMITE—all goods included in class 40. The Beldam Packing & Rubber Co., Limited, 29 Gracechurch street, London, E.C.3.
- 377,110. The word SPHINX—electric insulators of india rubber and gutta percha. H. G. Longford, W. W. Longford, and W. A. Clark, trading in co-partnership, 240-242 Bradford street, Birmingham.
- 377,646. The word CONCOR—india rubber machine belting and belting made partly of india rubber and partly of fabric included in class 40. The Manhattan Rubber Manufacturing Co., 120 Broadway, New York City. Address for service in the United Kingdom is, care of A. E. White, 88, 89 and 90 Chancery Lane, London, W.C.2.

THE DOMINION OF CANADA

packing, spiral packing, gaskets and valves, rubber belting, rubber

NEW ZEALAND

12,692. The word DUNLOP—covers and tubes for pneumatic tires. Dunlop
Fournie, Australia.

DESIGNS FOR TIRES.

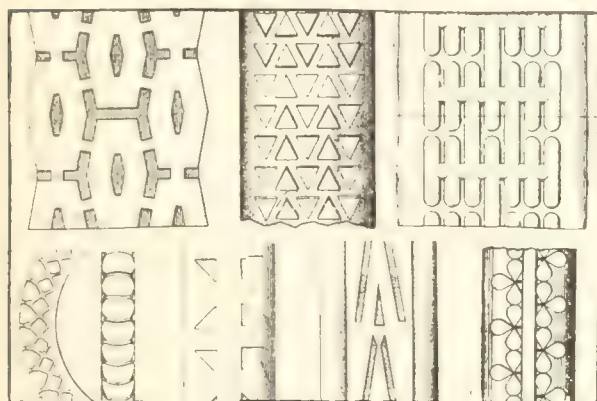
THE UNITED STATES

50,793. Tread for tire. Term 14 years. Patented April 12, 1917. M. I.
Oliver, Berkeley, Calif.
50,840. Tread for tire. Term 14 years. Patented May 1, 1917. W. B.
New York City.
50,871. Tread for tire. Term 14 years. Patented May 1, 1917. L. C.
River Forest, Ill.

50793

50840

50915



50873

50828

50871

50881

50,871. Tread for tire. Term 14 years. Patented April 16, 1917. F. T.
Faircloth, San Francisco, Calif.
50,873. Tread for tire. Term 14 years. Patented April 18, 1917. L. A. Jones,
Los Angeles, Calif.
50,881. Tread for tire. Term 14 years. Patented January 9, 1917.
E. Von Vargyas, Washington, D. C.

50,915. Pneumatic tire. Term 14 years. Patented April 12, 1917. Harry
R. K. Co., New York City.

CHANGES IN ZINC OXIDE PRICES

The New Jersey Zinc Co., New York City, announces the
following prices on American process and French process zinc
oxide, which went into effect May 29 and are subject to change
without notice:

AMERICAN PROCESS	HORSE HEAD BRANDS	
	Per Ton	Carloads, 100 tons
50,915	10.00	10.00

The above products are also available in paper bags of 50
pounds net weight when shipped in carloads. In this container
the price will be one-eighth cent per pound less than quoted above.
Bags cannot be shipped in less than carload lots. Mixed carloads
of barrels and bags cannot be shipped.

FRENCH PROCESS, "FLORENCE" BRANDS.

	Carloads, 100 tons	Less Carloads, 100 tons
White Seal	10.00	10.00
Green Seal	15.00	15.00
Red Seal	15.00	15.00

The above prices for both "Horse Head" and "Florence" brands
are based upon shipment in barrels and are f. o. b. shipping point,
with actual freight (not exceeding 30 cents per 100 pounds)
allowed on carload shipments.

MADERO GUAYULE INDUSTRY RESUMED.

AFTER three years' exile from Mexico, Alfonso, Gabriel and
Julio Madero, brothers of former President Madero, have
been granted full amnesty by the Carranza Government and all
their properties have been returned, including the guayule plan-
tations. Two other Madero brothers, Raul and Emilo, who
commanded Villista forces, have not yet been granted amnesty.
Don Antonio left San Antonio, Texas, for Mexico City early in
May and already the guayule factories are in operation and
within a few months should be working to full capacity.

The Madero interests operate eight factories having a com-
bined output of 350 tons of rubber monthly, the capacity of the
Parras factory, shown by the accompanying illustration, being
130 tons. The black smoke from the iron stacks is not produced
by soft coal, but by refuse guayule wood after the rubber has
been extracted, which provides the bulk of the necessary fuel.



FACTORY OF THE COMPANIA EXPLOTADORA COAHUILENSE, S. A., PARRAS, MEXICO.

Review of the Crude Rubber Market.

Copyright, 1917.

NEW YORK.

THE crude rubber market has been extremely dull during the entire month of June, a condition that is usually expected at this time of the year when the mills, as a rule, slow down for the summer. Arrivals for the past six weeks have been extremely heavy particularly at the Pacific ports. All of these shipments that have arrived are for the most part overdue rubber consignments to manufacturers who were thereby well supplied and not interested in nearby rubber. This left considerable stocks in dealers' hands, resulting in heavy liquidation that was the cause of the steady downward trend of values during the month. Later, however, an active interest developed in futures and substantial orders were placed by the manufacturers when the quotation of 64 cents was fairly well established for all positions covering the most part of 1918.

The price of plantation rubber has declined 15 cents and Upriver fine 5 cents a pound since June 1 when First latex crêpe and Smoked sheet ribbed spot were selling at 80 cents, and future positions of First latex crêpe and Smoked sheet ribbed were, July-September, 77 cents, October-December, 75 cents. Upriver fine was quoted 74 cents in an easy market, Upriver coarse 53 cents, Upper caucho ball 50½ cents, and Cameta 38 cents. Africans were dull and uninteresting with Prime black Congo in fair demand at 64 cents. Accra and Niger flake were both easy at 31 cents. Centrals had a limited demand with Esmeralda sausage at 52 cents, and Central scrap at 51 cents. As the month progressed with substantial arrivals of contract rubber, the holders of spot and nearby were forced to sell and the market continued to decline. On June 28 First latex crêpe and Smoked sheet ribbed, spot were 65½ cents, with 64 cents quoted for all positions in 1918. Paras were 3 to 4 cents higher in Para than in this market when Upriver fine was quoted 69 cents, Upriver coarse 49 cents, Upper caucho ball 44 cents, and Cameta 34 cents. Africans were dull and unchanged in price while Centrals had developed nothing interesting and prices had declined about 6 cents a pound.

Due to the efforts of the Legislative Committee of the Rubber Association, the proposed war tax of 10 per cent on crude rubber has been struck out of the War Revenue Bill now before Congress.

LONDON.

The report of a tax to be levied on American imports of crude rubber resulted in considerable buying on the part of dealers and served to strengthen the market early in the month. Later it was rumored that there was small possibility of this duty being imposed and the market weakened. Quiet conditions generally prevailed throughout the month and later developed positive dullness. The absence of all important buying interests was pronounced, strongly reflecting the position of the New York market. The situation here is generally accepted as resulting from the heavy shipments that have gone to America during the past six weeks and quiet times are looked for until replacements are required. Plantation rubber prices have declined about 7*d.* during the month just passed. On June Standard crêpe and Ribbed smoked sheets were both quoted a farthing less than 36*d.* with July-December deliveries at 36*d.* The spot market continued to steadily decline until June 28, when prices stiffened somewhat and Standard crêpe closed at 30½*d.* and Ribs at 29½*d.*, with futures holding very much higher than spot, an unusual market condition.

London and Liverpool imports for April were 10,000 tons compared to 8,780 tons for March. Re-exports for April were 8,200 tons against 4,059 tons for March.

SINGAPORE.

The shipping situation and the difficulties in negotiating drafts continue to harass the movement of shipments from this port. The market for the past month has been quiet and for the most part dull with principal attention centered on Ribs. At the auctions held in Singapore, June 1, 9, 16 and 23, the following average prices were realized: First latex crêpe 59.7 cents, compared to 65.36 cents last month; Smoked sheet ribbed, 60.19 cents, compared to 65.36 cents last month. The total amount sold was 1,549 tons, compared to 2,618 tons sold a month ago.

NEW YORK SPOT QUOTATIONS.

Latex and other products	July 1, 1916	June 1, 1917	June 28, 1917.
INDIAN OR PAJAS			
Post-late crepe	56	80	65
*Hevea first crepe			2
Amber crepe, light glistly	@	78	63
Amber crepe, dull	at	77	61
Brown crepe, thick clear	at	75	60
Brown crepe, thin clean, best			
"rolled	at	77	62
Brown crepe, thin clean	at	75	60
Brown crepe, thin speckly	at	73	58
Brown crepe, thin barley	at	69	56
Brown crepe, rolled	at	64	53
Smoked sheet, ribbed standard quality	at	80	65
*Hevea ribbed smoked sheets			
Smoked sheet, plain standard quality	at	81	64
*Hevea plain or smooth smoked sheets			
Unsmoked sheet, standard quality	at	79	62
*Hevea unsmoked sheets			
Singapore scrap, No. 1	@	60	48
Singapore scrap, No. 2	at	55	44
Colombo scrap, No. 1	at	61	49
Colombo scrap, No. 2	at	58	45
BRASILIAN PAPAS			
Univer fine	65	74	69
Univer medium	at		63
Univer coarse	59	53	49
Knipsack Madeira	at	at	75
Univer weak fine	at	at	60
Univer weak ball	46	50	44
Islands fine	80	at	66
Islands medium	at	at	58
Islands coarse	30	34	34
Islands weak fine	at	55	55
Cameta	35	38	34
Lower cauchio ball	48	46	41
Petuvim fine	at	72	67
Tapagos fine	at	73	67½
AFRICANS			
Acota flake	35	31	@
Niger flake	at	31	31
Benguela, extra seconds, 28%	@	41	41
Benguela, No. 2, 3 & 4	at	38	38
Benguela, No. 3, 40%	at	33	33
Congo prime, black upper	@	64	58
Congo prime, red upper	at	57	54
Rio Nunez ball	at	66	61
Rio Nunez sheets and strings	at	64	64
Corakry nuggets	61	62	64
Massar sheets and strings	59	64	64
CENTRALS			
Esmeralda sausage	41	@ 42	52
Central scrap	@	51	45
Central scrap and string	at	50	44
Central wet sheet	@	36	33
Gavale	39	30	35
MANGROVES			
Ceara scrap	@	@	32
Cara negro heads	at	at	42
Manicoba special	@	42	37
Manicoba extra	at	37	35
Manicoba equal	at	31	33
Mangabeira thin sheet	at	40	40
Mangabeira thick sheet	at	33	37
BALATS			
Balata block	at	60	67
Surimem sheet	70	at 70	78
EAST INDIAN			
Assam crepe	at	75	64
Assam onions	at	70	59
Penang black scrap	at	50	41
Pontarak 1st scrap	at	0	18
Bandjermasin	@	16	11
Gutta percha, red Macassar	1.50	@ 2.50	@ 12

* Rubber Association of America, nonexclusive.

IMPORTS.

(Same period 1915, 12,818,952 pounds; same period 1914, 10,057,264.) The export figures of rubber, given in the above table for 1914, include the imports re-exported. (These amount to 1,221,497-255,164 pounds from the Straits Settlements and 956,207 pounds from India.) To arrive at the total quantity of Ceylon rubber exported for that year deduct these imports from the total exports. The figures for 1916 and 1917 are for Ceylon rubber only.

PLANTATION RUBBER EXPORTS FROM JAVA.

To—	February.		Two Months Ending February.	
	1916.	1917.	1916.	1917.
HOLLAND:				
Hevea	29,120	.....	29,120	.....
GREAT BRITAIN:				
Ficus	2,512	2,523	3,876	3,038
Hevea	602,540	777,280	1,068,480	1,028,160
Ceara	11,979	4,035	11,979	6,193
Castilloa	5,382	4,377	11,066	7,009
Totals	622,433	788,210	1,095,401	1,044,400
UNITED STATES:				
Ficus	473	.....	3,912	2,578
Hevea	1,155,840	2,726,080	2,040,640	4,986,240
Ceara	6,560	.....	11,114	.....
Totals	1,162,873	2,726,080	2,055,666	4,988,818
SINGAPORE:				
Ficus	3,366	.....	5,419	2,398
Hevea	221,760	268,800	430,080	754,880
Ceara .....	.....	4,840	1,168	6,624
Castilloa .....	.....	796	2,255	797
Totals	225,126	274,436	438,922	764,699
JAPAN:				
Hevea	6,720	.....	40,320	.....
OTHER COUNTRIES:				
Ficus	1,672	.....	1,672	.....
Hevea	17,920	.....	17,920	6,720
Totals	19,592	.....	19,592	6,720

FEDERATED MALAY STATES RUBBER EXPORTS.

An official cablegram from Kuala Lumpur gives the export of plantation rubber from the Federated Malay States in May at 7,179 tons compared with 5,955 tons in April and 3,956 tons in the corresponding month last year. The total export for the year is 33,463 tons as against 21,977 tons for the corresponding period last year. Appended are the comparative statistics:

	1915.	1916.	1917.
January	4,411	5,995	.....
February	4,411	5,207	7,250
March	3,418	4,429	7,084
April	5,779	5,955	7,179
May	7,179	.....	.....
Totals	15,787	29,577	33,463

MOVEMENTS OF ALL KINDS OF RUBBER IN THE UNITED KINGDOM.

			Four months ended April,			
	April,					
IMPORTS:	1917	1916.	1915.	1917.	1916.	1915.
Dutch East Indies..... <i>tons</i>		324	39		989	713
French West Africa.....		101	63		385	168
Gold Coast.....		143	13		291	55
Other countries in Africa...		342	563		1,386	924
Peru.....		6	84		270	349
Brazil.....	1,553	1,533			4,541	4,749
British India.....		296	178		763	692
Straits Settlements.....		2,803	3,374		9,283	12,786
Federated Malay States...		1,368	1,281		4,222	4,373
Ceylon and dependencies...		588	1,133		3,565	6,614
Other countries.....		98	132		367	641
Total imports.....	10,110	7,602	8,128	34,295	26,062	32,064

Exports from United Kingdom during April..... 8,402 3,900 8,216 4,877 16,378 21,828

[The import and export figures by countries usually published in this table are withheld by the British Government.]

CRUDE RUBBER ARRIVALS AT THE PORT OF NEW YORK.

The following statistics are not complete, due to Government orders prohibiting access to the records.

[The Figures Indicate Weight in Pounds.]

PARAS.						
	Fine.	Medium.	Coarse.	Caucho.	Cameta.	Totals.
MAY 10.—By the <i>Purno</i> from Para:						
Hagemeyer & Brunn.....	30	52,177	124	254	=	52,177
MAY 16.—By the <i>Tela</i> from Para and Manaos:						
Raw Products Co.....	50,764	15,837	94,262	5,572	=	161,435
MAY 22.—By the <i>Tismari</i> from Bolivia:						
Muller, Schall & Co.....	10,430				=	10,430
JUNE 4.—By the <i>Itamaraca</i> from Para:						
Hagemeyer & Brunn.....					*23,761=	23,761
Aldens' Successors, Ltd..	20,200	5,700	32,000		=	57,900
General Rubber Co.....	41,000	5,300	3,500		=	49,800
Muller, Schall & Co.....	82,164	7,375	20,422	98,227	*4,475=	208,188
Meyer & Brown.....	73,900	9,000	19,900	136,600	=	239,400
Raw Products Co.....	22,548				=	22,548
H. A. Astlett & Co.....	19,769	13,090	112,574	21,238	41,406=	208,077
JUNE 4.—By the <i>Rio de Janeiro</i> from Para:						
Aldens' Successors, Ltd..	4,000	5,300	19,500		=	28,800
Muller, Schall & Co.....	36,740	2,837	3,990	3,600	=	47,167
Meyer & Brown.....	85,000	8,900	11,200		11,200=	116,300
Raw Products Co.....	31,693	1,445	2,977		=	36,115
H. A. Astlett & Co.....	13,838		21,406		34,188=	69,432

* Weak Fine

PLANTATIONS.

Pounds.		May 24 By the Rondo=Batavia:		Pounds.		Pounds.	
MAY 11.—By the Binteazog=East:		General Rubber Co.....	250,000	Raw Products Co.....	27,604	L. Littlejohn & Co.....	631,680
Raw Products Co.....	6,693	Charles T. Wilson Co., Inc.....	8,960	MAY 18.—By the L. Littlejohn & Co.....	130,200	Aldens' Successors, Limited.....	100,000
MAY 17.—By the Phemius=East:		Fred. Stern & Co.....	6,720	Raw Products Co.....	134,400	Charles T. Wilson Co., Inc.....	145,600
Raw Products Co.....	56,040	Meyer & Brown.....	170,000	Raw Products Co.....	212,800	Meyer & Brown.....	125,000
MAY 17.—By the Philadelphia=London:		Raw Products Co.....	17,585	MAY 24.—By the Avonio=Liverpool:		Hagemeyer Trading Co.....	8,960
Charles T. Wilson Co., Inc.....	31,360	General Rubber Co.....	40,000	MAY 24.—By the Vinovia=London:		Raw Products Co.....	6,773
MAY 17.—By the Saigon Maru=East:		General Rubber Co.....	113,300	MAY 24.—By the Hanna Neilsen=East:		MAY 28.—By the Malakuta=London:	
Fred. Stern & Co.....	15,680	Meyer & Brown.....	130,000	Aldens' Successors, Limited.....	574,000	Aldens' Successors, Limited.....	22,400
MAY 18.—By the Veendyk=Batavia:		MAY 24.—By the Hanna Neilsen=East:		Rubber Trading Co.....	74,973	L. Littlejohn & Co.....	100,000
Charles T. Wilson Co., Inc.....	11,200	Aldens' Successors, Limited.....	6,700	Charles T. Wilson Co., Inc.....	6,720	General Rubber Co.....	33,600
Raw Products Co.....	33,449	Rubber Trading Co.....	11,200	Raw Products Co.....	11,200	Fred. Stern & Co.....	58,000
MAY 21.—By the Saikai Maru=Singapore:		Charles T. Wilson Co., Inc.....	6,720	MAY 26.—By the Sitoebondo=Batavia:		Hagemeyer Trading Co.....	5,600
Charles T. Wilson Co., Inc.....	56,000	General Rubber Co.....	268,000	General Rubber Co.....	29,000		
Hagemeyer Trading Co.....	42,614	Meyer & Brown.....	15,045	Hagemeyer Trading Co.....	15,045		
MAY 23.—By the Baltic=London:							
Charles T. Wilson Co., Inc.....	6,720						

	POUNDS.
Raw Products Co.	8,960
Aldens' Successors, Limited.	11,391
Raw Products Co.	11,391
Charles T. Wilson Co., Inc.	4,500
Hagemeyer Trading Co.	15,183
Hagemeyer Trading Co.	21,840
Rubber Trading Co.	286,200
Meyer & Brown.	22,400
Raw Products Co.	13,222
L. Littlejohn & Co.	231,261
JUNE 4.—By the <i>Manistee</i> =London:	
Aldens' Successors, Limited.	574,000
Charles T. Wilson Co., Inc.	119,400
L. Littlejohn & Co.	22,519
Meyer & Brown.	12,000
JUNE 5.—By the <i>Manistee</i> =London:	
Aldens' Successors, Limited.	102,700
Charles T. Wilson Co., Inc.	22,400
L. Littlejohn & Co.	89,499
Fred. Stern & Co.	67,200
JUNE 8.—By the <i>Manistee</i> =London:	
General Rubber Co.	48,400
JUNE 10.—By the <i>Manistee</i> =Singapore:	
L. Littlejohn & Co.	39,358
Meyer & Brown.	22,400
JUNE 11.—By the <i>Celtic</i> =Liverpool:	
Aldens' Successors, Limited.	211,500
JUNE 12.—By the <i>Manistee</i> =East:	
Aldens' Successors, Limited.	6,600
Rubber Trading Co.	33,600
Charles T. Wilson Co., Inc.	4,480
Raw Products Co.	6,720
L. Littlejohn & Co.	94,080
JUNE 13.—By the <i>Manistee</i> =Liverpool:	
Aldens' Successors, Limited.	67,400
Charles T. Wilson Co., Inc.	17,920
L. Littlejohn & Co.	11,937
JUNE 14.—By the <i>Kangean</i> =Batavia:	
General Rubber Co.	439,500
Charles T. Wilson Co., Inc.	11,200
Meyer & Brown.	43,000
Hagemeyer Trading Co.	61,097
Raw Products Co.	65,390
L. Littlejohn & Co.	133,116
JUNE 15.—By the <i>Burma Maru</i> =Singapore:	
Charles T. Wilson Co., Inc.	11,200
Raw Products Co.	11,200
JUNE 16.—By the <i>Manistee</i> =Durham:	
L. Littlejohn & Co.	22,400
JUNE 17.—By the <i>Manistee</i> =Athens East:	
Fred. Stern & Co.	73,920
Hagemeyer Trading Co.	20,160
L. Littlejohn & Co.	107,520
JUNE 18.—By the <i>Saxonia</i> =London:	
General Rubber Co.	64,800
L. Littlejohn & Co.	123,200
JUNE 19.—By the <i>Manistee</i> =London:	
General Rubber Co.	33,600
Fred. Stern & Co.	33,600
Raw Products Co.	67,200
JUNE 20.—By the <i>Canada Maru</i> =East:	
Raw Products Co.	2,240
JUNE 21.—By the <i>Canada Maru</i> =London:	
Aldens' Successors, Limited.	178,500
JUNE 22.—By the <i>Canada Maru</i> =East:	
Raw Products Co.	4,480
JUNE 23.—By the <i>Kinta</i> =East:	
Raw Products Co.	2,240
JUNE 24.—By the <i>Euryolee</i> =East:	
Raw Products Co.	2,240

	POUNDS.
Raw Products Co.	4,480
Raw Products Co.	6,732
Raw Products Co.	13,440
Aldens' Successors, Limited.	245,000
Raw Products Co.	44,800
Charles T. Wilson Co., Inc.	5,600
Hagemeyer Trading Co.	7,280
Hagemeyer Trading Co.	10,290
Rubber Trading Co.	33,600
Meyer & Brown.	11,200
Rubber Trading Co.	11,200
Meyer & Brown.	161,160
(At Montical).—By the <i>Ionian</i> =London:	
Meyer & Brown.	13,700
Raw Products Co.	26,880
(At Pacific Coast).—By the <i>Manistee</i> =Singapore:	
Rubber Trading Co.	13,440
(At Pacific Coast).—By the <i>Sakai Maru</i> =Singapore:	
Rubber Trading Co.	6,720
(At Pacific Coast).—By the <i>Bankoko Maru</i> =Singapore:	
Rubber Trading Co.	2,240
CENTRALS.	
(At Pacific Coast).—By the <i>Ionian</i> =London:	
Meyer & Brown.	7,600
Raw Products Co.	3,700
General Rubber Co.	4,600
AFRICANS.	
May 23.—By the <i>Baltic</i> =England:	
Fred. Stern & Co.	22,400
May 28.—By the <i>Marengo</i> =London:	
Aldens' Successors, Limited.	46,300
JUNE 6.—By the <i>Colorado</i> =London:	
Aldens' Successors, Limited.	46,300
By the <i>St. Louis</i> =England:	
Fred. Stern & Co.	33,600
By the <i>Union</i> =England:	
Fred. Stern & Co.	6,720
BALATA.	
May 31.—By the <i>Nikheer</i> =Parambo:	
Muller, Schall & Co.	19,678
JUNE 15.—By the <i>Prinz Wilhem</i> =Parambo:	
Muller, Schall & Co.	65,524
GUAYULE.	
May 22.—By the <i>El Cid</i> =Galveston:	
Continental Rubber Co.	41,000
May 31.—By the <i>El Cid</i> =Galveston:	
Continental Rubber Co.	108,700
JUNE 4.—By the <i>El Mundo</i> =Galveston:	
Continental Rubber Co.	52,500
JUNE 5.—By the <i>All rail</i> :	
Continental Rubber Co.	28,800
JUNE 6.—By the <i>El Siglo</i> =Galveston:	
Continental Rubber Co.	40,000
JUNE 11.—By the <i>El Norte</i> =Galveston:	
Continental Rubber Co.	102,000
JUNE 14.—By the <i>Alba</i> =Galveston:	
Continental Rubber Co.	34,000
JUNE 19.—By the <i>Rio</i> =Galveston:	
Continental Rubber Co.	103,000

CRUDE RUBBER ARRIVALS AT SEATTLE.

(All arrivals in pounds net to the user.)

PLANTATION.

TO SEATTLE, WASH.

May 23.—By the <i>Inaba Maru</i> =Yokohama:	
L. Littlejohn & Co.	137,970
May 28.—By the <i>Manistee</i> =Hongkong:	
The Goodyear Tire & Rubber Co.	48,060
W. R. Grace & Co.	11,610
May 30.—By the <i>Canada Maru</i> =Yokohama:	
J. T. Johnstone & Co.	6,210
East Asiatic Co.	6,480
Charles T. Wilson Co., Inc.	18,765
W. R. Grace & Co.	2,430
Henderson & Korn.	45,900
May 30.—By the <i>Awa Maru</i> =Yokohama:	
Mitsui & Co.	8,370
H. B. M. Consul General.	12,960
June 8.—By the <i>Yokohama Maru</i> =Yokohama:	
W. R. Grace & Co.	8,775
Mitsui & Co., Limited.	42,120
June 11.—By the <i>Panama Maru</i> =Hongkong:	
Arnold & Zeiss.	68,450
W. R. Grace & Co.	10,605
J. T. Johnstone & Co.	540
June 11.—By the <i>Ixion</i> =Hongkong:	
United States Rubber Co.	200
June 12.—By the <i>Shimpo Maru</i> =Yokohama:	
W. R. Grace & Co.	9,315
H. B. M. Consul General.	61,020
June 17.—By the <i>Luise Nielsen</i> =Singapore:	
The B. F. Goodrich Co.	554,580
Charles T. Wilson Co., Inc.	7,560
Aldens' Successors, Limited.	103,680
Henderson & Korn.	62,910
Hagemeyer Trading Co.	12,960
Robinson & Co.	20,250
J. T. Johnstone & Co.	12,960
L. Littlejohn & Co.	63,720
W. R. Grace & Co.	42,255
Fred. Stern & Co.	34,560
East Asiatic Co., Limited.	8,370
Arthur Meyer & Co.	6,480
June 21.—By the <i>Manila Maru</i> =Hongkong:	
W. R. Grace & Co.	25,920
Arnold & Zeiss.	55,620
Charles T. Wilson Co., Inc.	22,680
L. Littlejohn & Co.	18,090
TO AKRON, OHIO.	
May 23.—By the <i>Inaba Maru</i> =Yokohama:	
The Goodyear Tire & Rubber Co.	40,095
Charles T. Wilson Co., Inc.	6,480
The B. F. Goodrich Co.	7,965
May 30.—By the <i>Canada Maru</i> =Yokohama:	
The Goodyear Tire & Rubber Co.	115,290
June 8.—By the <i>Yokohama Maru</i> =Yokohama:	
The Goodyear Tire & Rubber Co.	28,890
June 11.—By the <i>Panama Maru</i> =Hongkong:	
The Goodyear Tire & Rubber Co.	28,215
June 12.—By the <i>Shimpo Maru</i> =Yokohama:	
The B. F. Goodrich Co.	348,030
June 17.—By the <i>Luise Nielsen</i> =Singapore:	
Firestone Tire & Rubber Co.	374,085
J. T. Johnstone & Co.	62,775
Meyer & Brown.	50,355
Goodyear Tire & Rubber Co.	182,385
June 21.—By the <i>Manila Maru</i> =Yokohama:	
J. T. Johnstone & Co.	48,060
Goodyear Tire & Rubber Co.	43,065
TO NEW YORK, N. Y.	
May 23.—By the <i>Inaba Maru</i> =Yokohama:	
W. R. Grace & Co.	38,475
Robinson & Co.	5,130
Charles T. Wilson Co., Inc.	13,905
East Asiatic Co., Limited.	6,480
May 30.—By the <i>Canada Maru</i> =Yokohama:	
Robinson & Co.	72,900
J. T. Johnstone & Co.	16,335
Charles T. Wilson Co., Inc.	3,240
L. Littlejohn & Co.	38,745
Fred. Stern & Co.	11,200
East Asiatic Co.	7,155
Arthur Meyer & Co.	16,875
May 30.—By the <i>Awa Maru</i> =Yokohama:	
Rubber Trading Co.	17,010
Arthur Meyer & Co.	5,400

POUNDS.		
JUNE 8.—By the <i>Yokohama Maru</i> —Yokohama:		
The Goodyear Tire Rubber Co.	3,105	
The East India Co., Limited.	3,105	
W. R. Grace & Co.	35,910	
Charles T. Wilson Co., Inc.	1,620	
L. Littlejohn & Co.	7,830	51,570

JUNE 11.—By the <i>Panama Maru</i> —Hongkong:		
Charles T. Wilson Co., Inc.	3,510	
Fred. Stern & Co.	44,800	
Aldens' Successors, Limited.	5,000	
J. T. Johnstone & Co.	17,145	
L. Littlejohn & Co.	13,230	
Rubber Trading Co.	3,780	87,465

JUNE 12.—By the <i>Shimpo Maru</i> —Yokohama:		
W. R. Grace & Co.	12,150	
Charles T. Wilson Co., Inc.	99,765	
Robert Badenhop Co.	50,490	162,405

JUNE 17.—By the <i>Batavia Maru</i> —Singapore:		
Aldens' Successors, Limited.	60,750	
Charles T. Wilson Co., Inc.	34,425	
Rubber Trading Co.	30,780	
Henderson & Korn.	95,445	
United States Rubber Co.	434,835	
Fred. Stern & Co.	43,875	
Meyer & Brown.	1,620	
W. R. Grace & Co.	12,690	
L. Littlejohn & Co.	117,855	
J. T. Johnstone & Co.	14,000	
East Asiatic Co.	9,045	
Arthur Meyer & Co.	45,900	
Robinson & Co.	130,815	1,164,375

JUNE 21.—By the <i>Manila Maru</i> —Hongkong:		
L. Littlejohn & Co., Inc.	6,345	
Arthur Meyer & Co.	13,770	
Fred. Stern & Co.	18,765	
Aldens' Successors, Limited.	3,510	
Charles T. Wilson Co., Inc.	6,345	
Rubber Trading Co.	3,375	
J. T. Johnstone & Co.	10,665	62,775

TO WATERTOWN, MASS.

JUNE 12.—By the <i>Stamper Maru</i> —Yokohama:	
Hood Rubber Co.	37,430

TO TORONTO, CANADA.

MAY 30.—By the <i>Contra Maru</i> —Yokohama:	
J. T. Johnstone & Co.	11,475

MAY 30.—By the <i>Awa Maru</i> —Yokohama:	
J. T. Johnstone & Co.	11,475

TO MONTREAL, CANADA.

JUNE 17.—By the <i>Stamper Maru</i> —Yokohama:	
United States Rubber Co.	381,645

PONTIANAK.

TO SEATTLE, WASH.

MAY 23.—By the <i>Tensho Maru</i> —Singapore:	
L. Littlejohn & Co.	435,645
L. Littlejohn & Co. (Gutta)	23,490
	459,135

MAY 23.—By the <i>Inaba Maru</i> —Yokohama:	
L. Littlejohn & Co. (Gutta Siak)	44,280

JUNE 8.—By the <i>Yokohama Maru</i> —Yokohama:	
L. Littlejohn & Co. (Gutta Siak)	31,050

JUNE 17.—By the <i>Luise Nielson</i> —Singapore:	
L. Littlejohn & Co. (Gutta—untreated)	23,490

TO AKRON, OHIO.

L. Littlejohn & Co.	140,940
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JUNE 17.—By the <i>Luise Nielson</i> —Singapore:	
The United Malaysian Rubber Co. (Gutta—untreated)	67,500
	108,440

TO NEW YORK, N. Y.

JUNE 17.—By the <i>Luise Nielson</i> —Singapore:	
The United Malaysian Rubber Co. (Gutta—untreated)	203,310

CRUDE RUBBER ARRIVALS AT CLEVELAND.

PLANTATION.

TO AKRON, OHIO.

MARCH 2.—By the <i>Ceylon Maru</i> —Penang:	
J. T. Johnstone & Co.	11,200

MARCH 11.—By the <i>Empress Asia</i> —Singapore:	
The Goodyear Tire & Rubber Co.	163,679

MARCH 11.—By the <i>Monte Carlo</i> —Singapore:	
The Goodyear Tire & Rubber Co.	672,557

MARCH 14.—By the <i>Japan</i> —Singapore:	
The Goodyear Tire & Rubber Co.	386,134

MARCH 27.—By the <i>Lydras</i> —Singapore:	
J. T. Johnstone & Co.	44,800

APRIL.—By the <i>Empress Asia</i> —Penang:	
The Goodyear Tire & Rubber Co.	91,273

APRIL.—By the <i>Telamon</i> —Singapore:	
J. T. Johnstone & Co.	277,813

APRIL.—By the <i>Lydens</i> —Singapore:	
J. T. Johnstone & Co.	44,800

POUNDS.

APRIL.—By the *Antiochus*—Singapore:

British Consul General.	140,200
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MAY 11.—By the <i>Saikai Maru</i> —Singapore:	
Meyer & Brown.	74,349

MAY 16.—By the <i>Agapenor</i> —Singapore:	
J. T. Johnstone & Co.	58,573

MAY 18.—By the <i>Banka Maru</i> —Singapore:	
The Goodyear Tire & Rubber Co.	66,066
British Consul General.	31,502
	97,568

JUNE 6.—By the <i>Telamon</i> —Singapore:	
J. T. Johnstone & Co.	81,763

SCRAP.

TO CLEVELAND, OHIO.

MAY 7.—By the <i>La Touraine</i> —Bordeaux:	
Wells Fargo Express Co.	148

MAY 7.—By the <i>Espagne</i> —Bordeaux:	
Wells Fargo Express Co.	84

MAY 26.—By the <i>Rochambeau</i> —Bordeaux:	
Wells Fargo Express Co.	110

JUNE 26.—By the <i>Espagne</i> —Bordeaux:	
Wells Fargo Express Co.	118

CUSTOM HOUSE STATISTICS.

PORT OF BOSTON, MASS.—APRIL, 1917.

IMPORTS:	POUNDS.	VALUE.
India rubber	13,440	\$6,331
Rubber scrap	7,707	742
Manufactures of india rubber		2,312
Total		\$9,385

EXPORTS:	POUNDS.	VALUE.
Rubber scrap	110,944	\$11,004
India rubber boots, pairs	47,371	47,371
India rubber shoes, pairs	100,187	46,914
Automobile tires		77
Other rubber tires		419
Belting, hose, etc.		426
All other manufactures of rubber		5,838
Total		\$112,649

PORT OF BOSTON, MASS.—MAY, 1917.

IMPORTS:	POUNDS.	VALUE.
India rubber	170,554	\$86,708
Rubber scrap	93,409	5,323
Manufactures of rubber		3,030
Total		\$105,061

EXPORTS:	POUNDS.	VALUE.
Rubber scrap	46,960	\$5,210
Rubber boots, pairs	23,694	50,827
Rubber shoes, pairs	112,982	61,072
Automobile tires		995
Belting, hose, etc.		671
Other manufactures of rubber		3,745
Total		\$123,520

PORT OF CLEVELAND, OHIO—MAY, 1917.

IMPORTS:	POUNDS.	VALUE.
India rubber	336,509	\$206,602
Gutta jelutong (Pontianak)	342	28
Total		\$206,630

PORT OF DISTRICT OF MICHIGAN—APRIL, 1917.	POUNDS.	VALUE.
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Imports:	POUNDS.	VALUE.
India rubber	857,914	\$808,597
Rubber scrap	113,898	12,047
Manufactures of india rubber		44
Total		\$820,686

EXPORTS:	POUNDS.	VALUE.
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Exports:	POUNDS.	VALUE.
Rubber scrap	42,424	\$3,995
Rubber boots, pairs	147,882	11,041
Rubber shoes, pairs	1,905	5,525
Automobile tires		156
Other rubber shoes, pairs		31,614
Belting, hose, etc.		37
All other manufactures of india rubber		5,784
Total		\$83,574

PORT OF GALVESTON, TEXAS—MAY, 1917.

No transactions.	
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PORT OF DISTRICT OF MICHIGAN—MAY, 1917.	POUNDS.	VALUE.
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Imports:	POUNDS.	VALUE.
India rubber	857,204	\$508,595
Rubber scrap	123,898	12,047
Manufactures of india rubber		79
Total		\$520,721

EXPORTS:	POUNDS.	VALUE.
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Exports:	POUNDS.	VALUE.
Rubber scrap	107,732	\$8,080
Reclaimed rubber	1,250	160
India rubber boots, pairs	2,950	8,759

POUNDS.	VALUE.
Automobile tires	\$27,426
Other rubber tires	599
Belting, hose, etc.	2,557
All other manufactures of india rubber	14,628
Total	\$62,179

PORT OF NEW YORK—APRIL, 1917.

IMPORTS:	POUNDS.	VALUE.
India rubber	23,920,339	\$14,137,211
Balata	412,467	211,259
Gutta percha	317,442	143,289
Gutta jelutong (Pontianak)	809,113	35,548
Manufactures of india rubber		48,759
Total		\$14,576,066

EXPORTS:	POUNDS.	VALUE.
India rubber	32,799	\$19,865
Balata		44,779
Rubber scrap, imported	171,031	125,695
Rubber scrap, exported	97,067	10,707
Reclaimed rubber	135,893	8,500
India rubber boots, pairs	6,898	16,651
India rubber shoes, pairs	32,194	16,600
Automobile tires		968,919
Other rubber tires		81,948
Belting, hose, etc.		157,545
All other manufactures of india rubber		441,890
Total		\$1,913,108

PORT OF NEW YORK—MAY, 1917.

IMPORTS:	POUNDS.	VALUE.
India rubber	23,043,571	\$13,932,283
Balata	176,609	85,574
Gutta percha	17,902	6,634
Gutta jelutong (Pontianak)	1,974,930	72,685
Manufactures of india rubber		40,174
Total		\$14,143,350

EXPORTS:	POUNDS.	VALUE.
India rubber	47,120	\$27,777
Rubber scrap, imported	807,537	61,000
Rubber scrap, exported	84,519	11,562
Reclaimed rubber	10,100	1,138
Rubber boots, pairs	1,198	5,535
Rubber shoes, pairs	100,658	65,447
Automobile tires		759,938
Other rubber tires		111,313
Belting, rubber hose, etc.		161,030
Other manufactures of rubber		504,000
Total		\$1,713,453

PORT OF PHILADELPHIA, PA.—MAY, 1917.	POUNDS.	VALUE.
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Exports:	POUNDS.	VALUE.
Rubber scrap	30,430	\$3,002
Manufactures of rubber		7,025
Total		\$10,027

IMPORTS OF CRUDE AND MANUFACTURED RUBBER AT THE PORT OF NEW YORK.

May, 1917.

INDIA RUBBER—free:	POUNDS.	VALUE.
India	11,161	\$7,813
Netherlands	22,400	13,440
Portugal	1,074,426	397,724
England	11,838,203	8,419,389
Canada	124,112	83,168
Costa Rica		4,354
Guatemala	5,600	2,800
Honduras		1,047
Nicaragua	15,201	7,782
Panama		8,671
Salvador		448
Mexico		23,516
Cuba	103,075	72,766
Argentina		33,171
Brazil	5,175,512	2,136,604
Chile		1,314
Colombia		101,928
Ecuador	16,332	6,154
British Guiana	10,733	6,466
Dutch Guiana	906	828
Peru	85,489	46,832
Uruguay	5,032	1,997
Venezuela	51,303	25,539
Straits Settlements	834,404	511,016
Other British East Indies	873,281	496,595
Dutch East Indies	2,353,798	1,519,387
Philippine Islands		2,870
Portuguese Africa	3,735	1,658
Totals	23,043,571	\$13,932,283

GUTTA PERCHA—free:	POUNDS.	VALUE.
France	1,188	\$2,393
England	6,700	1,938
Argentina	1,974	2,303
Totals	17,902	\$6,634

March, 1917.			March, 1917.			March, 1917.		
	Pounds.	Value.		Pounds.	Value.		Produce of Canada. Value.	Reexports of Foreign Goods. Value.
Rubber thread, not covered:			MANUFACTURED—					
Dutch East Indies.....	1,859,794	63,101	Tires:					
Totals	1,974,930	\$72,685	Chicle, crude:					
Colombia	77,577	35,223	To—					
Venezuela	52,562	27,596	Great Britain			\$55,084		
Totals	176,609	\$85,574	United States			22,573		
Jamaica	2,532	148	Other countries			589		
Other British West Indies	1,772	36	Totals			\$78,246		
Brazil	30,675	3,365	Waterproof clothing:					
Totals unmanufactured.....	26,020,549	\$14,159,096	To—					
Canada	33,263	21,249	Great Britain			\$1,719		
Mexico	60,733	25,172	United States			\$33,682		
Newfoundland	8,501	3,873	Waste:					
Dutch West Indies.....	3,000	1,206	To—					
Totals	176,609	\$85,574	United States			\$30,798		
France	585	91	Great Britain			6,142		
Gibraltar	31	10	United States			366		
India	35,956	2,119	Other countries			2,774		
Straits Settlements	4,847	1,815	Totals			\$40,080		
Japan	1,815	1,815	Chicle, crude:					
Totals	46,174	\$29,477	To—					
Great Britain	821,057	\$631,761	United States			\$273,889		
United States	538,116	366,982						
Straits Settlements	244,886	151,996						
Totals	1,604,059	\$1,150,739						
Rubber, recovered:								
From—								
Great Britain	11,126	\$2,707						
United States	681,606	109,791						
Other countries	11,436	2,783						
Totals	704,168	\$115,281						
Hard rubber, in sheets and rods:								
From—								
Great Britain	23	\$36						
United States	35,452	25,583						
Totals	35,475	\$25,619						
Rubber substitute:								
From—								
United States	37,099	\$4,117						
Rubber, powdered, and rubber in gutta percha waste:								
From—								
Great Britain	67,306	\$3,301						
United States	198,255	14,539						
Totals	265,561	\$17,840						

LONDON AND LIVERPOOL RUBBER STATISTICS.

The import and export figures by countries usually published in this table are withheld by the British Government.

IMPORTS.

April, 1917.

Pounds. £ Sterling.

UNMANUFACTURED—		
Crude rubber:		
From—		
London	15,005,400	2,268,327
Liverpool	7,378,200	981,764
Totals	22,383,600	3,250,091
Waste and reclaimed rubber:		
From—		
London	21,800	501
Liverpool	145,500	3,213
Totals	167,300	3,714

EXPORTS.

Waste and reclaimed rubber manufactures of the United Kingdom:		
From—		
London	689,700	9,723
Liverpool	372,600	12,212
Totals	1,062,300	21,935

REEXPORTS.

Crude rubber:		
From—		
London	16,331,600	2,159,248
Liverpool	2,056,400	268,896
Totals	18,388,000	2,428,144
Waste and reclaimed rubber:		
From—		
London	22,300	1,535

RUBBER STATISTICS FOR ITALY.
IMPORTS OF CRUDE AND MANUFACTURED RUBBER.

January, 1917.

Pounds. Lire.

UNMANUFACTURED—		
India rubber and gutta percha—raw and reclaimed:		
From—		
Great Britain	82,060	.....
Belgian Congo	119,900	.....
Brazil	201,080	.....
Other countries	31,680	.....
Totals	434,720	1,580,800
Rubber scrap	43,780	17,910
MANUFACTURED—		
India rubber and gutta percha—threads:		
From—		
Great Britain	220	2,000
India rubber and gutta percha—sheets:		
Hard rubber	1,540	5,600

India rubber and gutta percha		
—pieces	Pounds.	Lire.
Elastic fabrics	4,600	12,600
Belted	2,860	9,100
Rubber coated fabrics, pieces	5,660	32,200
Boots and shoes, pairs		
From—		
United States	734	
France	1	
Totals	735	3,675
Elastic webbing:		
From—		
France	880	
Great Britain	220	
Other countries	440	
Totals	1,540	10,500
Articles not specified:		
From cut sheets		
Fabrics:	880	3,000
From—		
France	1,320	
Great Britain	3,710	
Other countries	880	
Totals	5,940	24,300
Tires and tubes:		
From—		
France	41,580	
Great Britain	20,900	
Other countries	220	
Totals	62,700	570,000
Other rubber manufactures:		
From—		
France	4,620	
Great Britain	16,720	
Totals	21,340	77,600
Total imports	2,354,285	

EXPORTS OF CRUDE AND MANUFACTURED RUBBER.

UNMANUFACTURED—		
January, 1917.		
	Pounds.	Lire.
India rubber and gutta percha		
—raw and reclaimed:		
To—		
United States	51,040	
Spain	72,600	
Totals	123,640	224,800
MANUFACTURED—		
India rubber and gutta percha		
—threads:		
To—		
France	2,860	
Great Britain	1,760	
Spain	2,200	
Argentina	1,760	
Other countries	220	
Totals	8,800	80,000
India rubber and gutta percha		
—sheets:		
Cut sheets	660	5,100
Hard rubber	1,320	4,800
India rubber and gutta percha		
—tubes:		
French tubes	3,080	8,400
Other tubes	4,180	13,300
Rubber coated fabrics, pieces	5,720	22,100
Elastic webbing:		
To—		
France	1,100	
Spain	2,420	
Switzerland	1,980	
Egypt	3,960	
Argentina		

	Pounds.	Lire.
Belgium	14,520	
Chili	1,980	
Cuba	2,640	
Other countries	2,200	
Totals	31,020	211,500
Clothing and articles for travel		
Articles not specified:	4,180	43,700
From cut sheets:		
To—		
Great Britain	660	
Argentina	2,200	
Totals	2,860	26,000
Fabrics		
	1,760	7,200
Tires and tubes:		
To—		
France	39,380	
Great Britain	195,800	
India and Ceylon	30,360	
Argentina	76,120	
Other countries	8,580	
Totals	473,000	4,300,000
Other rubber manufactures:		
To—		
France	6,600	
Great Britain	4,400	
Spain	1,100	
Switzerland	2,640	
Argentina	220	
Egypt	9,460	
Argentina	3,960	
Other countries	880	
Totals	32,340	117,600
Total exports	5,064,500	

RUSSIAN IMPORTS OF RUBBER AND GUTTA PERCHA, 1909-1914

From:	1909	1910	1911	1912	1913	1914
Belgium	829,610	302,988	270,525	396,770	346,272	108,210
Great Britain	4,797,310	5,482,640	3,426,650	3,318,440	8,981,430	11,434,190
Germany	4,436,610	4,725,170	4,580,890	6,420,460	6,672,950	4,472,680
Holland	1,695,290	1,082,100	901,750	2,092,060	1,262,450	937,820
Denmark	1,009,960	1,118,170	220,027	155,101	721,400	194,778
West Indies	1,514,940	577,120	937,820	1,659,220	3,246,300	4,184,120
Portugal	79,354	865,680	313,809	43,284		111,817
United States	865,680	973,890	1,551,010	3,174,160	4,075,910	1,370,660
France	396,770	306,595	292,167	310,202	504,980	230,848
Africa		577,120	1,623,150	1,695,290	176,743	147,887
Other countries	173,136	183,957	743,042	1,298,520	2,092,060	1,875,640
Totals	15,798,660	16,195,430	14,860,840	20,563,507	28,080,495	25,068,650
Value	\$12,314,460	\$20,334,210	\$14,197,380	\$17,438,430	\$20,479,560	\$14,663,520

EXPORTS OF INDIA RUBBER FROM MANAOS DURING MAY, 1917.

NEW YORK.						EUROPE.						Grand
EXPORTERS.	Fine.	Ex. Fine.	Sernamby.	Caucho.	Total.	Fine.	Ex. Fine.	Sernamby.	Caucho.	Total.		Total.
Tancred Porto & Co.	194,561	8,550	81,576	111,313	396,000	43,564	15,906	240	10,906	81,000	477,000	
General Rubber Co. of Brazil	80,286	7,944	50,755	156,015	295,000		15,906		58,832	75,000	370,000	
Stowell & Co.	42,717	1,996	22,312	197,205	264,230	2,105	10,307	59		12,471	276,701	
Adelbert H. Alden, Limited	23,419	10,601	9,132	64,674	107,826						107,826	
J. C. Araujo	42,720	4,757	36,732	594	84,803	30,458	3,611	2,076	39,771	80,917	165,720	
H. Balding						64,160	4,613	2,277	27,718	98,768	98,768	
G. Fradelizi		6,649	306	60,968	67,923						67,923	
Madeira Mamoré	839	97	152	48,938	50,026						50,026	
G. Fradelizi & Co.		22,418	10,768		33,186						33,186	
Gunzburger & Co.	8,504	640	2,656	1,183	12,983						12,983	
H. Semper	1,912	301	5,826	3,284	11,323						11,323	
Ahliger & Co.	3,926	291	2,359	3,346	9,922						9,922	
Moraes, Carneiro & Co.						2,617	1,677	1,014	2,352	7,660	7,660	
Amorim Irmao	1,109	140	3,740		4,989						4,989	
W. Peters				3,000	3,000						3,000	
Vianna Andrade & Co.				130	130						130	
Transit Iquitos	399,984	64,384	226,314	650,650	1,341,332	142,904	67,399	5,934	139,579	355,816	1,697,148	
	4,162		6,915	24,296	35,373						35,373	
	404,146	64,384	233,229	674,946	1,376,705	142,904	67,399	5,934	139,579	355,816	1,732,521	

EXPORTS OF INDIA RUBBER FROM MANAOS DURING APRIL, 1917.

NEW YORK.						EUROPE.						Grand
EXPORTERS.	Fine.	Medium.	Coarse.	Caucho.	TOTALS.	Fine.	Medium.	Coarse.	Caucho.	TOTALS.		TOTALS.
General Rubber Co. of Brazil	83,945	5,829	36,666	186,560	313,000	26,431	8,480	38	15,051	50,000	363,000	
Stowell & Co.	22,292	2,167	17,147	130,719	172,325	19,095	5,167	1,000		25,222	197,847	
Tancred Porto & Co.	68,245	17,466	30,179	3,910	119,800						119,800	
J. C. Araujo	5,000		12,120		17,120	24,800	2,560	1,410	23,684	52,454	69,574	
Ohliger & Co.	29,259	1,201	3,484	20,234	54,178						54,178	
Gunzburger & Co.	8,303	833	5,257	4,693	19,086						19,086	
H. Semper	5,880	2,124	5,678	1,289	14,971						14,971	
J. L. Traqueia	1,082	167	953	1,200	3,402						3,402	
Totals, April, 1917	224,006	29,787	111,484	348,605	713,882	70,326	16,207	2,708	38,735	127,976	841,858	
Totals, March, 1917	442,638	40,598	255,529	509,416	1,248,191	613,701	72,570	47,044	353,678	1,086,993	2,335,184	
Totals, February, 1917	839,239	175,801	411,945	427,365	1,854,350	642,822	27,590	17,942	200,292	889,646	2,743,996	
Totals, January, 1917	626,826	48,803	24,379	156,331	856,339	434,482	70,170	177,199	130,568	821,388	1,677,727	

RUBBER STATISTICS FOR THE UNITED STATES.

IMPORTS OF CRUDE AND MANUFACTURED RUBBER

October 1
to December 31, 1916.

		VALUE.
Totals	73,700,448	\$36,162,374
Crude rubber:		
15 cents per pound, 20 per cent	10,130	2,044
		\$907,047
		\$21,437
		93,642
		11,597
		772
		2,782
		\$130,239

THE MARKET FOR RUBBER SCRAP.

Copyright 1917

NEW YORK

MOVEMENT in the rubber scrap market for June has been confined to comparatively small trading between large and small dealers. Those who have held accumulations for higher prices were disappointed through the lack of demand that has characterized the market of the past month. This was due to the entire absence of the consuming trade, as the large buyers have persistently avoided creating any real buying interest. Despite the fact that the crude rubber market has been dull, rubber scrap has been firm and high for the greater part of the month but during the last week a tendency to decline was noticeable. The arrival of the dull season in rubber manufacture does not bespeak activity in the rubber scrap market for the immediate future.

BOOTS AND SHOES. Transactions have been confined to dealers' business, although sales have been reported at \$9.60 a hundred delivered to the mills. The ruling price, however, is generally conceded to be 9¾ cents delivered, but this figure has failed to attract the interest of consumers to any great extent. Trimmed and untrimmed arctics are about ½ cent higher than a month ago.

TIRES. The strength of this material has been largely due to replacement orders on the part of large and small dealers. Mixed tires experienced considerable activity about the middle of the month and solid tires were in fair demand at the same time. Inner tubes have shown strength, a strange anomaly in the face of a declining rubber market. The volume of business has been small and price changes negligible.

MECHANICALS. There has been some business doing in this material, garden hose being the feature of the list with air brakes and cotton fire hose following. Prices have advanced about ½ cent on these grades since last month. The same easier conditions prevailed with mechanicals that have characterized all the other sorts of rubber scrap during the last week of the month. London and Liverpool imports of waste and reclaimed rubber for April were 167,300 pounds, compared to 114,600 pounds for March. Re-exports for April were 22,300 pounds, against 55,900 for March. London and Liverpool exports of waste and reclaimed rubber manufactures of the United Kingdom for April were 1,062,300 pounds against 815,300 pounds for March.

NEW YORK QUOTATIONS FOR CARLOAD LOTS DELIVERED.

JUNE 27, 1917.

Prices subject to change without notice.

	PL. POUND
Boots and shoes	\$0.000, 0
Trimmed arctics	.08 @
Untrimmed arctics	.07 @
White tires, Goodrich and Goodyear	.07 1/4 @ .07 1/4
Auto tires, standard white	.07 1/4 @ .07 1/4
standard mixed	.07 1/4 @ .07 1/4
stripped, unguaranteed	.05 1/2 @ .06
Auto peelings, No. 1	.10 @
No. 2	.09 @
Red scrap, No. 1	.13 1/2 @
red	.11 @
Irony tires	.07 @
Bicycle tires	.07 @
Solid tires	.07 @
Clean truck tires	.08 @
White scrap, No. 1	.14 @
No. 2	.10 @
Red scrap, No. 1	.10 @ .11
No. 2	.05 1/4 @
Mixed black scrap, No. 1	.05 1/4 @
No. 2	.04 @
Rubber car springs	.05 1/2 @
Horse shoe pads	.05 1/2 @
Mattings and packings	.01 @
Garden hose	.02 1/4 @
Air brake hose	.06 @
Cotton fire hose	.02 7/8 @
Large hose	.02 @
Hard rubber scrap, No. 1, bright fracture	.28 @
Battery jars (black compound)	.04 @
Rubber heels	.04 @

Non-ferrous

THE MARKET FOR CHEMICALS AND COMPOUNDING INGREDIENTS.

Copyright 1917.

NEW YORK.

THE base metals are all higher than a month ago, with lead the leading feature, having steadily advanced until later in the month, when hesitancy on the part of buyers and the withdrawal of the leading producers halted the advancing market. While the amount required by the government is unknown, it is believed that the remaining supply will not be sufficient to meet the regular consuming demand. The spelter market has been dull with few sales reported, but the undertone is firm, due to the belief in a stronger market in the near future. Metal antimony has recorded small price changes and a generally dull market. Aluminum has continued quiet, with small demand at nominal prices. The steady inquiry during the past month has resulted in a good volume of business in all rubber chemicals. While the shipping situation has not improved generally, the restrictions controlling certain materials have been modified by the efforts of the producers with favorable results. The consuming interests have been in the market for regular supplies, with a particular interest in future requirements. All lead products have been in demand, and prices have advanced materially, due to the strong position of pig lead. During the past month the speculative zinc oxide market reached the highest levels since April 1, 1916. That the production for the last half of the year will not equal the consuming requirements is believed in some quarters.

ALUMINUM FLAKE. There has been only a fair call and prices have declined about \$2 a ton since a month ago.

ANILINE OIL has been easier with prices about 2 cents lower than a month ago. Supplies are apparently sufficient for present requirements.

BARYTES. This material has not been particularly active and spot supplies have been freely offered at unchanged prices. Foreign grades are limited with prices nominal.

Zinc oxide, American process, horseshoe brand	
"XX red".....f. o. b. factory..lb.	10 1/2 @
"special".....f. o. b. factory..lb.	11 @
French process, red seal.....f. o. b. factory..lb.	15 1/4 @
green seal.....f. o. b. factory..lb.	15 3/4 @
white seal.....f. o. b. factory..lb.	16 1/2 @
Zinc substitutes.....ton	30.00 @
Zinc sulphide, pure.....lb.	78 @
yellow.....lb.	

* Nominal prices.

TIRE FABRICS

JENCKES SPINNING COMPANY

PAWTUCKET RHODE ISLAND

SEA ISLAND COTTON CROP MOVEMENT. FROM AUGUST 1, 1916, TO JUNE 8, 1917.

		Receipts.
		1916-17.
Stock on hand August 1, 1916—		
Savannah, 2,401; Charleston, 107.....bales		2,508
Received at Savannah.....		47,647
Received at Charleston.....		3,472
Received at Jacksonville.....		40,931
Total.....		94,558
Less exports.....		93,001
Stock June 8, 1917—		
Savannah, 1,553; Charleston, 4.....		1,557
Crop in sight at all ports to date.....		91,856

EXPORTS.

From	To				Totals.
	Great Britain.	Continent.	Northern Mill.	Southern Mill.	
Savannah.....	1,296	173	40,750	6,162	114
Charleston.....	337	...	2,681	557	...
Jacksonville.....	...	...	40,931	...	...
Totals.....	1,633	173	84,362	6,719	114
					93,001

In addition to the exports shown above, it is estimated that at least 20,000 bales, and probably more, have been shipped direct from interior points to Southern mills and to Northern mills via Norfolk, but as no official record of cotton so shipped can be kept it is impossible to give the exact figures.

(Compiled by John Mallock & Co., Savannah, Ga.)

EGYPTIAN COTTON CROP MOVEMENT.

FROM AUGUST 1, 1916, TO MAY 2, 1917.

To—	1916-17.	1915-16.	1914-15.
Liverpool.....bales	191,477	191,672	184,740
Manchester.....	123,320	124,158	138,383
Total shipments to Great Britain.....	314,797	315,830	323,123
To—			
France.....22,432 }	32,653	52,574	40,239
Spain.....10,221 }	44,698	42,166	165,651
Italy.....26,959 }			
Switzerland.....17,739 }			
Russia.....26,161	39,389	39,370	
Greece.....65	725	2,357	
Total shipments to Continent.....	103,577	134,854	247,617
To—			
United States.....	105,215	186,654	141,547
India.....100 }	9,205	23,210	13,603
Japan.....9,105 }			
Total shipments to all parts.....	532,294	660,548	725,890
Total crop (interior gross weight), cantars.....	4,726,518	6,473,726	

(Compiled by Davies, Benach & Co., Liverpool.)

THE MARKET FOR COTTON AND OTHER FABRICS.

Copyright 1917.

NEW YORK.

AMERICAN cotton experienced a series of sensational price advances during the past month as the result of scarcity of stocks and a persistent demand. On June 1, spot middlings were 22.65 cents, with December futures at 22.01 cents. June 26, spot middlings were 27.15 cents and December futures 26.58 cents. This persistent bull movement was due to the acute state of the Liverpool market resulting from the steadily diminishing holdings of American cotton and the inability to replenish stocks through lack of shipping facilities. The suspension of business in futures on the Liverpool Cotton Exchange and the closing of the Havre cotton market soon followed. There is little apprehension felt that similar measures will be adopted on this side, as the situation is entirely different. Liverpool is a distinctly consuming market and being isolated from the sources of supply is temporarily prevented from receiving stocks by shortage of carriers.

EGYPTIAN COTTON. The first direct shipment of Egyptian cotton from Alexandria, consisting of 15,000 bales valued at \$7,500,000, was discharged at Boston early in the month. The S.S. *Elele* on which this cargo arrived, was torpedoed on the return trip. It is reported there are still 20,000 bales of the present crop held in Egypt or England for the account of local buyers. As our importations are 200,000 bales yearly, these shipments would, if delivered, be a comparatively small matter; moreover, they are all for contract delivery. There is, however, some relief promised by the Textile Alliance recently formed that will cooperate with the British Government to release Egyptian cotton under guarantees similar to those of the Rubber Association. The cotton will be cleared in private invoices and delivered to the fumigation plants in bond.

SEA ISLAND COTTON. The Charleston and Savannah markets are closed for the season as the crop has all been marketed and sold. The new crop will not come to market before October. The crop in all three states is reported to be doing well, although about two weeks backward; however, it is too early to make definite forecast of the final outcome.

TIRE FABRICS. The tire fabric producers have been called on by the government for about 25 per cent of their capacity to be used in the production of army duck. This will obviously reduce tire loom capacity and, if protracted, may cause a shortage in tire fabrics. While the demand has been quiet during the past month in some quarters, it was reported in others that buying had been renewed. Contract deliveries, however, have been regularly called for by the consuming trade.

It is understood that Peeler fabric, strictly speaking, is made from 1 1/8 to 1 7/16-inch staple, although 1 1/16-inch staple is often the minimum. Peeler yarns have a high tensile strength

DUCK, SHEETINGS, DRILLS, OSNABURGS. The government's call for 50,000,000 yards of 12-ounce army duck has greatly strengthened the market, resulting in a strong demand from the regular consuming trade and a material price advance in the entire list. The loom capacity of the mills has been strained to take care of government orders that have precedence over all others. Hose and belting duck have been active, with 52 cents quoted on both grades, an advance of 10 cents a pound since a month ago, and mills are sold up to April of next year. Sheetings are scarce at purely nominal prices while drills and enameling duck are well sold into next year. Prices have advanced about 5 cents for drills and 3½ cents for enameling duck since our last report.

UNIVERSITY OF CHICAGO

Repa	0.81	a	10
Rep	0.24	a	27

* Nominal prices.

They have also recently taken over the product of the Panola Cotton Mills, Greenwood, South Carolina, with 17,500 spindles and 400 looms.



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Edited by HENRY C. PEARSON—Offices, No. 25 West 45th Street, NEW YORK.

Vol. LVI. No. 5.

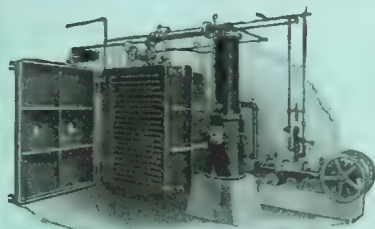
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Published on the 1st of each month by

THE INDIA RUBBER PUBLISHING CO.

No. 25 West 45th Street, New York.

Telephone—Bryant 2876.

CABLE ADDRESS: IRWORLD, NEW YORK.

HENRY C. PEARSON, Editor

Vol. 56

AUGUST 1, 1917

No. 5

SUBSCRIPTIONS: \$3.00 per year, \$1.75 for six months, postpaid, for the United States and dependencies and Mexico. To the Dominion of Canada and all other countries, \$3.50 (or equivalent funds) per year, postpaid.

ADVERTISING: Rates will be made known on application.

REMITTANCES: Should always be made by bank draft, Post Office or Express money order on New York, payable to THE INDIA RUBBER PUBLISHING COMPANY. Remittances for foreign subscriptions should be sent by International Postal Order, payable as above.

DISCONTINUANCES: Yearly orders for subscriptions and advertising are regarded as permanent, and after the first twelve months they will be discontinued only at the request of the subscriber or advertiser. Bills are rendered promptly at the beginning of each period, and thereby our patrons have due notice of continuance.

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Entered at the New York postoffice as mail matter of the second class.

TABLE OF CONTENTS ON LAST PAGE OF READING.**FORTY MILLION HEVEAS IN THE PHILIPPINES.**

FORECASTING the future is a fascinating employment, and the crude rubber situation is a very tempting field in which to let one's fancy wander. Therefore not to prophesy but just to imagine, suppose England were obliged to put an export duty of 20 cents a pound on her plantation rubber, it would cost the rubber trade of the United States say \$25,000,000 a year. Suppose that Holland, having suffered cruelly through the war, also imposed a tariff of 20 cents a pound. It would cost American manufacturers \$4,000,000. Moreover, suppose the powers that be at Washington put, say, 5 cents a pound import duty on crude rubber. That would be an added tax of \$13,400,000, making a total of \$42,400,000.

All of the above are at least supposable. On the other hand, suppose American capital had some five to ten mil-

lion healthy Para rubber trees coming into bearing in our own territory in and about Mindanao. (There is room for hundreds of millions.) Such rubber would not bear an English, Dutch or American tax, either export or import. It would come to our factories at a market rate of 25 cents a pound less than British and Dutch, or indeed Brazilian rubber.

Or why stop at 10,000,000 trees? \$42,000,000 invested in *Hevea* trees would mean 42,000,000 trees just coming into bearing with an increase that would in a very few years make the Southern Islands of the Philippines one of the great rubber plantation sections of the world.

TU CHUNG RUBBER IN AMERICA.

IT has been definitely established that the rubber-producing *Eucommia ulmoides*, the tu chung tree of China, can be readily acclimated in other temperate countries and that it is perfectly hardy in Massachusetts. Whether the product of its bark, leaves and fruit is to be regarded as rubber or gutta percha still remains a moot question. In either case, however, it is valuable, gutta bringing $2\frac{1}{2}$ to $3\frac{1}{2}$ times as much as *Hevea* first crêpe or ribbed smoked sheet in the present market. As a feasible future supply, even though only partial, but grown within the borders of the United States, it may yet rank in importance with guayule, and deserves the attention of practical investigators as to its character, extraction and possible commercial uses. The tree being hardy in Massachusetts, it is reasonable to expect that it will also thrive elsewhere in America where suitable soils occur and the mean annual temperature corresponds to that of its Chinese habitat. Suitable regions are therefore clearly indicated by an isometric map showing the line of 59 degrees Fahrenheit across the United States. Moderately high valleys of the Allegheny, Blue Ridge, Rocky, Cascade and Sierra Nevada foothills suggest themselves as localities where altitude, soil and rainfall are likely to be particularly favorable.

SIXTY MILLION TIRES ANNUALLY AFTER 1920.

IT is not surprising that automobile tire manufacturing has become the principal department of the American rubber industry. Fully 4,000,000 cars are in operation in the United States to-day, a number more than four times the total for the rest of the world, and still the demand for machines keeps well ahead of the 40 per cent average yearly increase of past years. Time alone can tell what effect, if any, the war may have upon this demand, but once prices regain their normal level the result is certain. The proportion of pleasure cars is large, but motor trucks in ever greater numbers are replacing the shortage of horses caused by the war, both in peaceful occupations and warfare itself. Leading automobile men assert that the point of saturation will not be reached until every family having an income over \$1,000 owns a car. This means not less than 10,000,000

cars, or two and one-half times the present total. Assuming an average life of five years per machine, an annual replacement of 2,000,000 cars, our present production, will be necessary to maintain 10,000,000 in operation.

Translating this prediction into tires, 10,000,000 cars will average five tires annually, or 50,000,000 in all. The 2,000,000 cars constructed every year will require 8,000,000 tires for original equipment, and as each owner soon buys a spare for quick change on the road 2,000,000 more may be added, making a colossal grand total of 60,000,000 tires and a business amounting to \$1,250,000,000 annually.

THE IMPORTANCE OF COST ACCOUNTING.

THE value of the Federal Trade Commission's comprehensive campaign of education in cost accounting can hardly be overestimated. If the expert information, constructive suggestions and proffered cooperation be heeded, the results promise to be epoch-making in the upbuilding of American industry on a more stable basis than hitherto.

Business success at all times depends upon a complete and accurate knowledge of the cost of production and of selling. This is more emphatically true to-day than ever before because of keen competition in our home markets, due to ever-rising prices, and the certainty of even keener competition in the markets of the world after the war. We want a rightful share of the world's trade, particularly that of the western hemisphere; but it must be secured at a profit if it is to be worth the getting, and the manufacturer who does not know his true costs may price his goods foolishly and impair the business of his sound competitors while he ruins his own. The cost of selling, no less important than that of production, is too often almost entirely lost sight of. Every manufacturer must expect to face the low prices due to efficiency, but even the most efficient concern is not always able to meet cut-throat prices based on ignorance.

It is a fact that hundreds of industries are at the present time without adequate information regarding their own affairs, indicating that a large number of executives, however intimate their technical knowledge of manufacturing processes, do not have an intelligent grasp of general business methods. The Federal Trade Commission recognizes that the only basis for any industry is a solid foundation of fact, and that the installation of adequate cost accounting systems will not only insure fairer competition and better prices based on efficiency, but will remove many of the difficulties arising between competitors in business as well as between the government and business. To this end, the initiative has been taken to cooperate with trade associations endeavoring to work out uniform and adequate cost

accounting systems for their entire industry. It is not the intention to urge any particular method. Each industry must work out its own plan, but the Commission stands ready to act in an advisory capacity and to approve as the standard system for any particular industry that method of accounting which is found to be adequate and uniformly satisfactory to those concerned. In lending hearty support to this progressive movement the rubber trade will be doing itself and the nation a service.

TRAINING YOUNG MEN FOR EXPORT TRADE.

PERHAPS the greatest need in building up a successful foreign trade in rubber goods, or manufactured articles of any sort, is a staff of representatives who speak the language of the nation to which they are to go; who understand the details of the business they are to represent; and who have had a sound training in economics, finance and commerce, with minds trained to grasp situations quickly and schooled in what might be termed the diplomacy of business. Young and aggressive, though tactful men, are needed; men who will not require so much direction upon assuming their posts as to make them cost more than they are worth.

To meet this need quickly and well, progressive rubber manufacturers may well take a leaf from the book of the National City Bank of New York. In order to provide men for its many foreign branches, this great institution has worked out a plan of co-operation with universities and colleges whereby promising juniors and seniors are taken into the bank during their summer vacations and upon their graduation are placed in a preparatory training class. During these periods of training every effort is made to teach them not only the fundamentals of the business they are to represent, but those things which are so essential to foreign work, such as national characteristics and customs, methods of doing business and practical business conversation in the required foreign tongue.

England and Germany have long been pursuing similar methods in the promotion of foreign trade, and such a course on the part of American industrial as well as banking firms will do much to obtain and secure our logical share of the world's commerce after the war.

IF THE RESULTS OF GERMANY'S U-BOAT ACTIVITIES are measured by arrivals of crude rubber from England, the campaign is a failure.

For the first six months of 1916, approximately 11,000 tons of crude rubber was imported to the United States from London, Liverpool and Hull. For the first six months of 1917, there were 24,000 tons, or more than double that amount, from the same ports, and that despite the German submarines.

What I Saw in the Philippines—II.

By the Editor of The India Rubber World.

Kobe and Away—The Inland Sea and the Yellow Sea—Some Chinese Characteristics—Mr. Chang—Earlier Meetings with This Remarkable Oriental—His Corona Corona Experiment—I Meet Him Again in Shanghai—His Description of Tu Chung Rubber—He Elucidates His Plan for Tu Chung Plantations in the United States—An Astounding Scheme for Bringing About a Second "Rubber Boom."

IT is a long journey from New York to Manila, but one broken by several interesting way stations. In midwinter the stop in the Hawaiian summer land is very grateful, but after that it is distinctly cold. Indeed, sailing from Vancouver, and of course taking the extreme Northern circle to save miles, it is frigid at first, then cold, and finally off Formosa chilly and then warm.

Our stop in Kobe was brief, cold and uninteresting. Incidentally, as small pox was raging in Osaka, all on board were vaccinated. The voyage through the Inland Sea was dreary, snow squalls and chilly winds being the rule. And when we ran out into the Yellow Sea, it was not much better, as everything was blotted out by a bitterly cold, dense fog. We had a lot of Chinamen aboard, steerage passengers, and as first class passengers many Americans, Standard Oil men, and others resident in Shanghai. As we neared their home port they talked China very informingly and quite enthusiastically.

I wonder why we look with such tolerant contempt upon the Chinaman? A few hundred years with Bryan as our Confucius and our population grown to 600,000,000 would see the Americans just the same type of non-resistant, much-enduring creatures, and possibly wearing pig tails by decree of some autocratic boss. I doubt, however, if we ever were as universally honest as they.

I have always liked the Chinese, they are so bland, cheerful and fatalistic. They also are past masters in the art of minding their own affairs. A steamer friend went with me down to the steerage to see the Fan-tan, Chuck-a-luck, and other games. He was an adept at pigeon English and he spoke thus to one husky Chinaman.

"Spousee Jap man come chop chop makee fight?"

"No blong my pigeon, blong soldier pigeon. Him makee fight," was his contented reply.

I was eager to see Shanghai again, partly because the city interested me and more because I wanted again to meet Mr. Chang. I first met him on a P. & O. boat in 1904 voyaging from Ceylon to Singapore. He was a big, fine-looking man clad

in the richest of Chinese costumes, suave, observing and possessed of a serene dignity that was most impressive. Withal he possessed the keenest sense of humor mingled with a tolerance that bespoke the thinker and philosopher. The brusque Englishman, the egotistical German, and the thin-skinned, somewhat boastful American, all interested and often patently amused him.

I found him a veritable encyclopedia of information concerning affairs in the Far East. He knew rubber thoroughly; gutta percha seemed an inheritance; he confessed that his family for years had been financially interested in trading for it in the Philippines, in Borneo and Java. He knew all of the gutta grades in Singapore and was the first to give me an accurate

description of the *Dyera costulata* that produces Pontianak.

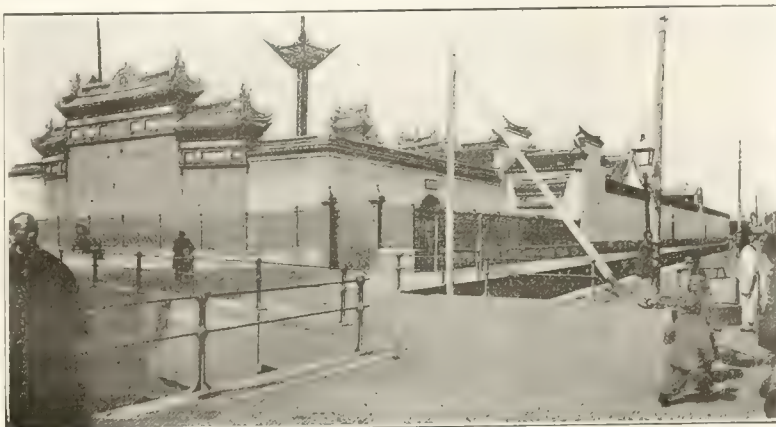
I shall never forget the clever way in which he turned the tables on a young chap who guyed and patronized him by turns. After winking to the rest of us, the American told of the discovery of a geological freak in Yellowstone Park—two deposits of mineral rubber and sulphur; of their mixture by volcanic action, and of the product being forced up through a geyser in the form of tubing hundreds of miles in length. And this was but one of many which he thought Chang swallowed.

One day, however, Chang handed him a cigar, saying:

"From the shape and the box you will think them Corona Coronas. They are, however, more costly. The Corona costs one dollar, Mexican, each. These cost me twenty dollars each. Smoke up and give me your opinion as to their value."

The guyer settled down to full enjoyment of his priceless cigar, apparently reveling in delicious aroma, praising the exquisite texture of the wrapper, expounding upon the sensuous sedative effect of—

"Some years ago," Chang broke in, "I brought home some seeds of the common American weed known as Mullein and propagated them. The leaves were rather coarse at first, but by cultivation I have arrived at a very much finer texture.



THE CHINESE BANK, SHANGHAI.



UNLOADING AT SHANGHAI.

Your Corona is made of Mullein, not tobacco. I only make a box a year and that is why, including the years of experiment, they cost me so much. How do you like them?"

"Pretty good imitation, as far as the appearance goes," said the Guyer judicially, dropping the unconsumed half into a cuspidor, "but, of course, you cannot really imitate tobacco to the connoisseur. You cannot get the fine flavor, the delicious aroma, the pearly ash, the sensuous sedative effect—"

"Man without imagination is a machine, a clod," said Chang. "You have vision, imagination, great. I never even saw a Mullein leaf. You were smoking a Corona Corona of real tobacco. Have another and don't be angry. Remember the stories you have been telling to a credulous Chinaman. Remember also that lying was a fine art in China before America was discovered. Shall we cry quits and say *parce nobiscum*?"

I met Chang again on the "China" going from Hong Kong to Shanghai in 1905. Then I got better acquainted, and dining with him in the last named city, finally sized him up as one who would be a big man in any country, and, further, one who because of his unusual perspective would be a very sage and sane analyst of world conditions in the rubber or in any trade.

He was an omnivorous reader, and as he was a graduate of a leading English university his outlook was exceedingly broad. India rubber was his hobby. He knew it wild and planted. Not only that, but he knew the big factories the world over, had a good idea of machinery and processes, and had formed opinions of the leaders of the trade that were surprisingly accurate.

As I neared Shanghai, I, therefore, read again a letter received from him in New York the day before I had started for the Philippines. It read:

My Dear Mr. Pearson:

To us slow thinking Orientals the tremendous growth of your American rubber business is startling. It is fully as remarkable as the rise of the British rubber planting interest which you will recall I forecasted pretty accurately in 1904.*

There are still surprises and wonderful developments in store for your trade. I could greatly desire to discuss them with you. Many American rubber men stop here *en route* for the Eastern rubber fields. Why not you? A visit from

you would be most enjoyable, and I think interesting to you. Your old friend,

Chang.

In time we hove to off the mouth of the Yangtse Kiang, waited for a pilot, and went up the great river, and the next day were ashore with two days of shore leave ahead of us.

I at once looked up Mr. Chang in his modest but luxurious apartments.

Skiping over the preliminaries of greeting and trade gossip, and getting at once to the matter that was on his mind, said he rather abruptly:

"Why do not the Americans grow rubber at home?"

"They are experimenting with guayule in Texas," I replied. "Nothing else seems to be in sight at present."

"I wonder why our Tu Chung rubber would not be of interest to your people. You know it?"

"Only in a very misty way," said I. "You mean the product of the Chinese tree *Eucommia ulmoides*?"

"That is it. That is just it, and it has a future, I am sure. The tree is about the only rubber producer in the world that thrives in the temperate zone. It stands winters such as you have in New York state without any trouble at all. The bark is full of rubber. I have many times taken a piece of the dried bark of the tree, broken it and found it full of threads of rubber. It looked like the product of the grass rubber vine of Africa."

"What quality of rubber?"

"Ah, that I don't know. The idea only came to me lately to try and introduce it into America, perhaps as a reforestation scheme. The tree really has very profitable possibilities. Here in China we use the dried and powdered bark as a medicine and it sells for \$1.50 gold a pound. It is a specific for certain kinds of rheumatism, and

is not poisonous. Now this same bark contains rubber, about 3 per cent, I believe. Just picture the possibilities, say, \$1 a pound for a valuable drug, and more than enough rubber in it to pay for the cost of cultivation and gathering. Do you not think the experiment worth the trying?"

* The prediction of this amazing Chinaman was that the rubber production of the Malay States in ten years (1914) would be greater than that of the Amazon Valley.



TU CHUNG RUBBER TREE, 8 YEARS OLD.
ARNOLD ARBORETUM, BOSTON, MASSACHUSETTS.



BARK OF A TU CHUNG RUBBER TREE SHOWING THREADS OF RUBBER.

Photos are from the Bureau of Plant Industry, Washington, D. C.

"Where can I see some of these trees?" said I eagerly.

"When you return home, go to the Arnold Arboretum in one of Boston's suburbs, and you will see several. They have been growing there for some years."

That was the gist of his chat and the primary reason for his wish to see me. Of course we discussed *Hevea* planting in the Philip-pines, which he favored. Just back from Singapore, he also entertained me with planting gossip and information.

As I was leaving he said:

"Suppose plantation rubber in time reached a level of 30 cents gold a pound. As it drops there would be all sorts of efforts on the part of planters' associations to create artificial uses for the surplus and to curtail production to bring prices up. Personally, I believe that new and great uses for rubber will render such action unnecessary, but if one were a speculator there is a better, surer way."

"And that is?"

"Secure the bulk of the world's vulcanized rubber scrap. Distill it into caoutchoucine and other valuable by-products. If the scrap was cheap enough, and one had bought crude gum, around, say, 30 cents, when it went to a dollar the profit would be quite considerable."

The next morning, just before we sailed, Mr. Chang came aboard to say good-bye. As usual, he had something unusual to say.

"It was not Tu Chung rubber or a boom in crude rubber that I wanted to talk to you about—to get you thinking over," he said. "It was this, and I hope you will watch developments carefully. The United States and China as well will get into the world war. The Prussian, through teaching his people that they and their desires are all important, has come to possess a super-egotism that is akin to madness. His sense of proportion is entirely atrophied. The outrages in America will bear their fruit. As for China, she has been oppressed by many nations, and by the individuals of many

peoples, but by none so brutally or so universally as by the Germans. So, as I said, both of our countries will enter the war on the side of the Allies. In time, say a year or two, there will come a shortage of labor. So great will this be that the huge reservoirs of willing, tractable laborers, particularly in China, will be needed. Labor unions will see that

their members are not menaced. First in the tropics, and later in the temperate zones, the Chinese laborer will be used by the tens of thousands. In your own line, on rubber plantations, and in American rubber factories, you will see Chinese help. America is rich enough to afford it, and, mark my words, before the American consents to put his women folk

in trousers and force them into factories, she will scour the world for masculine workers. And it should be so. It is the beginning of the world federation that will utilize, guard and profit by the producing capacities of every race under the sun."

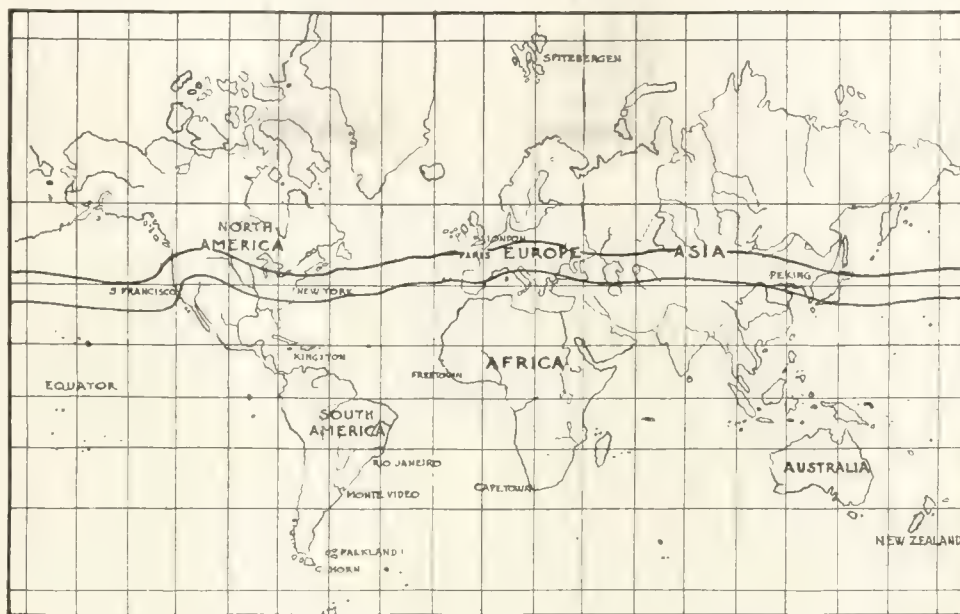
"Perhaps you are right. At any rate, the tropical need for your labor is great and growing greater," said I. "There is, however, a point you seem to miss. You have lots of labor. Why not use it right where it is, right at home?"

"How?"

"Well, you believe rubber growing to be a good proposition. Start your millions of coolies growing milkweed, rabbitweed or some other minor rubber product—something that will give an annual crop. Put a million or so at it and the rubber product will be considerable."

"Maybe some time. No can do now," said Chang with a smile.

With that he departed, and we proceeded down the Yellow River, turned



ISOTHERMAL LINES BETWEEN WHICH TU CHUNG RUBBER WILL GROW.



IN THE INLAND SEA.

south and pointed the boat's nose for Luzon.

It's a long way to Luzon—that is, from New York; it takes a solid month to get there by railroad and steamer, two months by magazine. Here I expected to find much that would be of interest and my hopes were not disappointed.

(To be Continued)

India Rubber in War.

By Robert G. Skerrett.

MUCH is heard of the part steel is playing in modern warfare, but has the world, or indeed the rubber trade itself, half grasped the extent of india rubber's vital contribution to this monster world-wide conflict? Hundreds upon hundreds of our factories are working to capacity in order to produce rubber products of one sort or another, and now that we have joined hands with the Entente Allies these establishments must expand and run well-nigh continuously to turn out a still greater volume of these myriad commodities. Our rubber industries may well look up and feel a sense of pride in the part they have played and the greater part they are bound to play in this Titanic struggle.

The past three years of war in Europe have brought to a focus the inestimable value of rubber and, what is more, have clearly emphasized the fact that chemistry's cunning has not yet evolved a really all-round substitute. Germany's initial use of motor-truck service gave a new complexion to the problem of shifting quickly great bodies of fighting men, and probably Paris would have fallen to the Teuton troops if General Maunoury had not rushed to the battle-front a whole army by means of Parisian taxicabs. All of the belligerents then suddenly awakened to the need of self-propelled vehicles, and it was not long before they grasped, as well, the fundamental requirement of an abundance of rubber tires.

THE IMPORTANCE OF TIRES.

In the earlier stages of the war wastage in tires was little short of appalling. This was due to lack of organization, the casting away of damaged tires upon the roadside, and the frequent employment of misfit tires in a service that covered rough roads with the heaviest of burdens. Among the Allies a goodly measure of order has been instituted in this extremely important department of supply and transportation, and there are now operating centers to which all injured tires must be sent. New ones are no longer issued to a driver without question as to his disposition of the worn ones. Even so, the wear and tear are tremendous, and it is said by those in a position to know, that solid rubber tires in military service seldom average more than 1,500 to 2,000 miles. This is less than one-tenth of the mileage commonly expected in commercial use. Over-loading, over-speeding, hard service in all sorts of weather upon all kinds of roads exact their toll when necessarily combined with indifferent attention, while the exigencies of the moment preclude careful driving, and hasten destruction.

TIRES FOR 150,000 MOTOR VEHICLES.

It is safe to say that the Allies, in their various fields of military activity, have in service for transport and staff work rubber-tired automobiles and motor trucks to the number of

300,000 or more. These machines are using up, at a conservative estimate, certainly five times as many pneumatic and solid tires as would ordinarily be expected under normal conditions. And let it be remembered that this durability is secured in a large degree by reason of rubber fillers of one sort or another that make it possible to drive the pneumatic tire until it is almost completely worn out. No wonder, then, that Germany has made desperate efforts to obtain rubber, for, despite her network of railroads, the ultimate mobility of her forces and the maintenance of their supplies of all sorts depends basically upon motor vehicles.

According to the estimates of the Council of National Defense and our military authorities, an army of a million men will require anywhere from 30,000 to 40,000 motor trucks, and bids for these have already been asked. Inasmuch as it is said that we are to raise an available and thoroughly equipped force of 2,000,000 to 2,500,000 men, we shall need at least 100,000 motor trucks for transport and supply service alone. This does not take into account the ambulances for hospital service and the thousands of automobiles that would be required for various staff duties. It is probably safe to say that we shall have to have a maintained organization of substantially 150,000 motor

vehicles of one kind or another in order to keep the service up to wartime demands. With our knowledge of tire consumption abroad, and with the figures already cited, our manufacturers are clearly face to face with a giant task in this one department of the rubber industry.

MOTORCYCLE TIRES.

Very recently our government asked for bids for 10,000 motor-cycles. This number will unquestionably be greatly increased, because it is a matter of record that the British army alone has in the neighborhood of 100,000 of these machines in service to-day. So far as carrying dispatch bearers and mounted scouts is concerned, the wear and tear upon tires would be hard, but not as disastrous as the stresses of motor-truck service. However, it is evident that a large number of our

ultimate array of military motorcycles will be equipped with side-cars and also provided with machine-guns. For work of this sort the motor-cycle must be both powerful and rugged, and the ultimate burden will rest upon the rubber tires. Here the tax will be excessive and it is quite likely that tire deterioration will equal that of the motor truck, because the machine-gun squads must reach their destinations whenever it is humanly, physically and mechanically possible to do so.

In connection with automobiles, motor trucks, tractors, ambulances and motor-cycles, it must be remembered that rubber is also used in a variety of subordinate ways. For instance, there is rubber in the construction of the batteries of self-



A SOLDIER'S FIELD KIT.

starters, the electric wiring calls for rubber insulation, and rubber is employed in the handles of starting cranks, controller levers, radiator caps, gasoline tank caps and steering wheels. Some of the ambulances used by the British have permanent features in the shape of rubber buffers and stops, and rubber flooring has made it easier to keep these cars clean and likewise to provide a surer footing when handling the wounded.

THE AIR SERVICE AND RUBBER.

Nor should the vehicle wheels of the warplane be forgotten, because it is upon these that the initial start and the safety of landing fundamentally depend. Resiliency is absolutely necessary, and rubber only will furnish the springy tire needful to facilitate rising from the ground and to help absorb in a very large measure the shock incident to landing. It is not possible here to go into the niceties of this matter other than to say that nothing but the best of rubber will serve this purpose; and the perfected flying machine tire has called for a good deal of experimenting in order to meet the peculiar demands of the service.

It has been authoritatively declared that five airplanes are needed yearly to maintain a single flyer aloft, and this quota is additional to the replacement of aircraft demolished by gunfire. No wonder, then, that the French army organization, as it exists to-day, calls for 30,000 flying machines annually. This takes no account of the British, the Belgian, the Russian and the Italian service, and does not consider at all the aircraft needs of the enemy. We have virtually promised to send abroad 20,000 aviators, and to maintain a force of this size we shall have to build every 12 months quite 100,000 machines. The rubber industry will have its hands full, not only in furnishing the tires, but other rubber parts which virtually duplicate many of those of the automobile. Further, there are special features, peculiar to the warplane, incident to the mounting of machine guns, the growing equipment of wireless installations, and the need of additional shock absorbers, in the form of cushions where the radial supports converge, when bombs are carried. Finally, the best of the fighting flying machines have their wings covered with a rubberized fabric in order to prevent the absorption of moisture and the burdening of the aircraft with useless dead weight; and rubber tubing is used more or less extensively to prevent chafing where control wires and stays touch neighboring surfaces.

The seaplane, because of its frequent contact with the water, needs rubber extensively; in fact, it calls for quite as much of this material as the airplane, despite the fact that it generally dispenses with wheels for starting and landing. It is absolutely necessary that all electrical features be doubly protected against moisture, and all controls, both hand and foot, seats, gages, etc., must be either waterproof or watertight, as the case may be. The airmen must have rubber suits covering them from head to foot, and should carry air-inflated rubber life belts, together with respirators of the same material, which will make it possible for them to endure a submergence of 30 minutes in case of accident when entangled in their wrecked machines at sea. Rubber covers are now called for to protect light machine-guns

whether on shore or afloat, and as many of the big seaplanes have one or more of these weapons it is plain that rubberized cloth figures very largely in this service.

As long as we are more or less up in the air, let us consider that other branch of aviation which concerns captive balloons and dirigibles. Of the latter, the most successful development among our Allies is in the form of what the British call "blimps." The blimp is a gas-bag modeled to some extent along the lines of a giant fish or whale. The first of these produced for the navy, officially known as D N-1, is 175 feet long, and has a maximum diameter of 35 feet. The outer envelope contains 2,500 yards

of double-texture rubberized fabric, and the internal balloonets, of which there are two, call for some hundreds of yards more. It is said that the government will have 300 of these blimps for home service. Already the second of the sixteen contracted for has been given a trial flight, and the naval authorities are said to be enthusiastic. Large orders will undoubtedly be placed at an early date. This dirigible is provided with pontoons beneath the chassis which makes it possible for the blimp to settle upon the water. These pontoons are long cylinders of rubberized



A UNITED STATES ARMY MOTOR TRUCK WITH RUBBER TIRES, PROOFED COVER AND DRIVER'S SHELTER.

fabric stuffed with kapok, a silky fiber of great buoyancy.

Next there is the kite balloon for naval service, which is a passive elongated gas bag that can be towed from a steaming craft for the purpose of aerial scouting as well as detecting the approach of submarines or discovering U-boats in hiding below the waves. The land counterpart of the kite balloon is generally the so-called more or less globular or pear-shaped gas bag familiar to most of us. We shall probably have to have scores of kite balloons and the ordinary captive observational balloons. Plainly, our manufacturers of proofed material will have to provide us with hundreds of thousands, yes, millions, of yards of rubberized fabric. Thousands of these aircraft are now in service abroad. Rubberized gloves, rubber-banded helmets to protect the aviators in case of falls, goggles, and rubberized suits are extensively worn by the flyers in all departments of aviation.

RUBBER REQUIREMENTS OF THE ARMY.

And now let us consider the rubber needs of the army fighting man, *per se*. During the past fiscal year, that of 1916-1917, the War Department called for bids on 47,312 ponchos and 24,380 slickers. These, it will be remembered, were to cover the requirements only of the army's regular peace time establishment. The specifications for the cloth demanded a rubber content of not less than 30 per cent of the best Up-river fine Para rubber or best Ceylon rubber and not more than 6½ per cent of the best reclaimed rubber. Counting the proposed initial force of 650,000 in the National Army, 300,000 in the standing army, and State Militia or National Guard to the number of 300,000—as it would be if recruited to the maximum—this gives us some idea of the number of ponchos and slickers needed in the first six months of conflict. Every man and officer has either a slicker or a poncho. This, in substance, constitutes the regulation rubberized clothing prescribed heretofore by the United States military authorities.

To-day, because of the lessons learned on the battle-fronts abroad, particularly those taught by trench warfare, rubber equipment of a variety of sorts is now recognized as indispensable. Owing to the well nigh continual presence of water in the trenches, rubber hip boots have become a regular part of the soldier's equipment, and in many cases the rubber stocking, worn between two woolen or cotton socks, meets the average need at any time but stormy weather. The rubberized ground sheet, with which each fighting man abroad is supplied is the European substitute for our poncho. It not infrequently has served as a shroud when the soldier has fallen on the battlefield. The wastage in trench boots, rubber stockings and ground sheets is enormous; in fact, it has been estimated that the total wastage of all rubber goods at the front, 18 months ago, was in the neighborhood of 4,000 tons daily. This destruction has unquestionably greatly increased in the interval, and will be a good deal higher after we join forces with our Allies.

The officer boasts some additional rubberized articles, such as a waterproof valise, a sleeping-bag and a collapsible rubber bathtub or basin. Staff officers also are provided with rubber fabric motor-rugs, and all of the men of the motor-ing-service have rubber garments, while motorcyclists have proofed overboots and leggings combined. Rubberized cap-covers are well-nigh universal, and a combination hood and cape of waterproof material is growing steadily in favor. The gas mask, in which proofed fabric and rubber sponges play a prime part, is a universal article of equipment.

Every man and officer must have one, and a substantial reserve should be available to take care of wastage. With every mask there should be a waterproof wallet in which to keep the respirator which neutralizes the action of the poisonous atmosphere.

The foregoing equipment of rubberized articles or garments is necessary, in fact is the regulation outfit abroad; and we shall have to provide our troops accordingly. In addition it is optional, especially among the officers, to supply themselves with waterproof toilet cases, pocket filters with rubber tubing, and goggles that call for more or less rubber in their make-up. Rubber gloves are extensively in demand in certain branches of the military service, particularly where live electrical circuits have to be dealt with and also in the handling of certain explosives. This is notably the case in the charging of mines, floating and otherwise, and wherever guncotton is used for the bursting charge.

Regarding the need of rubber in its protective capacity against the attack of acids, the manufacture of smokeless powder, guncotton, nitroglycerine, dynamite, etc., calls for rubber gloves

and rubber aprons, not to mention boots. Every pound of these explosives utilizes sulphuric and nitric acid at one stage in their preparation, and it would be impossible for the workers to perform their tasks without the aid of rubber garments. Many hundreds of thousands of tons of explosives have been produced since the war began; enormous quantities of nitric acid, sulphuric acid, and other chemicals have been manufactured in the last two years and a half; and in the whole of this grim industry, rubber in one shape or another has been indispensable. This business of providing munitions has grown to tremendous proportions in this country, and the factories will work to still greater productiveness in order to furnish our army and our fleet with its needful explosives.

An integral part of modern warfare is the extensive use of the telephone; indeed, fire control is well-nigh universally regulated in this way. Everyone knows how important rubber in one form or another is to an efficient telephone service, and on the battle-front that service absolutely must be efficient in every particular. Therefore, insulation is insisted upon to an extent that is not deemed needful ordinarily, and mainly because the physical conditions are infinitely more trying.

Nothing answers like rubber for this purpose, where wet ground and continual moisture have to be contended with. Again, there are the circuits of mining and countermining operations, improvised lighting and power systems — particularly where searchlights are employed — and wire entanglements are charged with high-voltage currents. Thousands upon



THE RUBBER-TIED WHEELS OF AN ARMY AIRPLANE, SHOWING THE RUBBER CUSHIONS IN THE AXLE SHOCK ABSORBERS WHERE THE RADIAL SUPPORTS CONVERGE.

thousands of miles of insulated wire have been and will be required. Our own fighting force in Europe will have to be supplied generously in kind.

As part of the transport service and the "supply train" equipment, we must not forget waterproof motor hoods, cart covers and collapsible rubber horse troughs, water buckets and tanks. And that the powder shall not fail in the hour of need there is also provided a vast array of rubberized powder bags. The treads of the "tanks" and the heavy guns and mortars also need rubber blocks to make them equal to the varied conditions of the roads or ground over which they have to make their way. And, finally, in considering the army's needs, those aids to effective fighting, field glasses, range-finders and telescopic sights must be included. In all of these optical auxiliaries either hard or soft rubber, or both, are required, and while quantitatively the amount of this material is trifling compared to rubber's other uses, still its service is important.

RUBBER REQUIREMENTS OF THE NAVY.

Our navy has long been a big consumer of rubber, and even

in times of peace the fleet's demands have grown steadily year by year. It is not possible to give more than an approximate idea of the amounts, simply because the shipbuilders provide

the bulk of this when the vessels are constructed and Navy Department advertisements for any twelvemonth cover only wear and tear or replacements. But the volume of these replacements is suggestive, and shows some of the directions in which rubber enters into the effective work of our battle craft and the outfitting of our blue-jackets. Therefore the following list is given:

MUCH RUBBER IS USED IN THE MAKE-UP OF THE NAVAL DIVER'S EQUIPMENT

Rubber hose, all kinds	3,000 feet
Hard rubber knobs (electric service)	1,100
Gaskets, various	32,000
Boots	8,500 pairs
Squeegee blades	25,000
Washers	3,000
Elastic webbing	5,000 yards
Buttons	110,000 dozen
Rescue breathing apparatus	100 sets
Diving apparatus, complete	14 sets
Diving suits	150
Rubber packings	1,500
Sheet rubber for packing	442,000 feet
Rubber insulated wire, ignition circuits	1,000 feet
Rubber insulated cable	600 feet
Rubber gloves, acid proof	1,520 pairs
Hard sheet rubber	3,500 pounds
Rubber pump valves	2,250 pounds
Rubber ferrules	27,600
Rubber insulating tape	9,450 pounds
Acid-proof rubber belting	500 feet

Manifestly, these are by no means all of the ways in which rubber is used in the navy. Rubber tiling or rubber flooring and rubber mats, step treads, door stops, and the like, are to be found in every direction on fighting craft of all sorts. The dreadnought boasts an electric power plant that would meet the needs of a good big town. This form of energy must be perfectly controlled and only the best of rubber insulators will answer. Therefore this material has an extremely wide service to perform in this department alone; and, because of the character of the original installation, replacement is seldom required except upon a modest scale.

As can readily be understood, the submarine, with its dual motive system and recourse to electrical propulsion when traveling under water, uses rubber more extensively than any other fighting craft—judged upon the basis of its total displacement or

dead weight. The batteries have hard rubber containers or jars; the positive and negative plates are isolated by hard rubber separators, and the accumulators have other hard rubber fittings. Sponge rubber condensers serve to arrest the particles of electrolyte in the rising gases, and frequently soft rubber ventilating tubes are provided to draw off and to exhaust forcibly any accumulation of hydrogen. Because of the moist atmosphere, induced by the sweating hull plating, all electrical wiring and connections have to be insulated with the utmost care. This is especially necessary in view of the high potential of the current fed from the batteries to the propulsive motors and to the various electrical auxiliaries that now do much of the operative work in a submarine. The under-water boat has a number of hatches and openings to the sea of large diameter which must be sealed hermetically when the craft submerges, and in order to insure this watertightness, seatings or gaskets of extra heavy soft rubber are employed. The doors of the various watertight compartments also are made secure by rubber packing, while rubber matting, rubber treads, etc., are found in many directions.

The wireless outfit, of course, has its necessary measure of insulation provided by hard and soft rubber; the periscopes are made watertight and yet free to move by means of rubber packing; the electricians have to have rubber gloves and use rubber tubing in testing and overhauling the storage batteries; the internal lighting system, of course, is safeguarded by rubber-

covered circuits; and, finally, the submarine's prime weapon, the torpedo, cannot get along without rubber—especially the rubber diaphragm which plays a vital part in the torpedo's depth control. Rubber, too, enters into the construction of the submarine mine which, as we all know, can be carried and planted by under-water craft. Of course, the officers and crews of submarines, because of the exceptionally wet work of the service, have hip-boots of rubber and, generally, hats and overdress of the same material. Escape helmets for the personnel of submarines contain a good deal of rubber in their make-up, and all of our under-water boats are supplied with these.



THE RUBBER SUIT OF A SEALANE PILOT.

At the present time it is not in keeping with the policy of the government to go further into detail as to quantities of any of our fighting material. It was for that reason that a list was given of an average rubber consumption for a peacetime year in the fighting fleet. Under normal circumstances, the enlisted personnel of the navy is less than 60,000. Now, with many of our ships in reserve fully commissioned for wartime service, with scores of auxiliary craft added to the fighting fleet, and with the Coast Guard a part of the regular navy, it is safe to

say that our water-borne defense force numbers in the neighborhood of 150,000. These figures will serve to give an approximate notion of the increased demands for rubber equipment for the men, as well as rubber needed aboard the augmented fleet. Indeed, the drive of wartime duty is sure to add greatly to the figures of peacetime consumption.

It will be borne in mind, besides, that the Marine Corps has been raised from 17,000 to substantially 30,000 men. The Marines need an equipment similar to that of the army man, but as our sea soldiers are expected to fight ashore and afloat they must be thoroughly prepared to meet the physical conditions of either service. No mention has been made of the Naval Militia, *per se*, because this excellent body of State fighting men is now amalgamated, almost in its entirety, with the personnel of the battle-fleet.

So far, nothing has been said about the medical departments of the army or the navy, as such, simply because the whole subject of taking care of the wounded can just as well be treated for both services under a single head. It is quite out of the question to give details as to quantities, but a recital of some of the uses to which rubber is put by the military surgeon and the military hospital will suffice to suggest the volume of these commodities that must be supplied continually from now on. In any estimates, it is only safe to assume that sooner or later our navy, in its entirety, will have to share in the ravages of battle. And whether it does or not, medical provision for such an emergency will have to be made.

HOSPITAL RUBBER REQUIREMENTS.

To begin with, the army that is to be sent abroad at the earliest moment will need quite 28,000 doctors, and the medical corps of the navy should total no fewer than 2,000. All of these men must have rubber gloves and, preferably, rubber operating aprons. Only recently, one of the British War Commission declared that on a short section of the front as many as 20,000 to 30,000 are wounded in the course of a battle lasting but a few hours! Happily, quite 50 per cent of those hurt are able to return to duty within a comparatively short period, and experience has shown that 25 per cent, after furloughs for convalescence, can return to the front; and, finally, something like 17 per cent, after more or less prolonged stays in hospitals, are able to resume their duties. However, these results in any case are made possible only by the best of surgical treatment, and, because of the constant danger of infection, a great many of the wounds call for careful and systematic sterilization. It is in this work that rubber plays a prime part in the form of tubing, which is an essential feature of the present apparatus employed to drain or irrigate the wounds.

Another revolutionary innovation is a system of elastic bandages which, without stitching, pull the wound surfaces gradually together and produce a minimum of deformation. All of the ambulances, operating rooms, and surgical wards require rubber sheeting. There are hot water bags, ice bandages or caps, pads, inflatable pillows and mattresses calling for rubber or proofed material; bulb and bag syringes, medicine droppers of first-aid packets, basins, sprays, operating caps, crutch tips, ether bags, bottle stoppers, sponges, catheters, rubber flooring, rubber heels for hospital attendants, rubber-tired wheelbarrows for carrying stretchers, and hundreds of other ways in which rubber helps to save life, eases the wounded, and effects administrative economies in the military hospitals either in the field or at the bases. Rubber gloves and aprons are quite as necessary for the nurses and ambulance attendants as they are for the surgeons. Of nurses and other attendants there must be a small army for a fighting force of a million and more men at the front. Further, the care of the wounded will not be the only concern. Despite serums and the like, disease may lay a heavy toll upon our fighting men on the fields of Europe. And in the treatment of fever stricken soldiers, rubber articles of one sort

or another will be indispensable in steadily increasing quantities.

At the time of writing this article, the American flag is flying over six great base hospitals in France—institutions wholly administered by American surgeons and physicians. Just what this means can be gathered from the equipment of a single unit. Each of these comprises 1,600 beds; and the total of the six hospitals is 9,600 beds! What we shall have to provide for when our part in the conflict is in full swing is, of course, purely speculative. However, it is evident, from what has been needed in the treatment and care of the wounded of the Entente Allies, that we shall have to provide enormous quantities of rubber surgical goods available on the other side of the Atlantic and likewise very large supplies ready for our fighting fleet.

PROTECTED OCCUPATIONS IN ENGLAND.

IN England, where conscription has greatly depleted working forces, it has been found desirable to prepare a schedule of protected occupations affecting men employed on Admiralty, War Office, or munition work, or in railway workshops, Admiralty work being taken to include merchant shipping. It is not intended to enlist such men as had attained the age of 32 on January 1, 1917, and for the present such men who are not passed fit for general service, "Category A," will not be recruited. Otherwise the schedule is provisional and subject to revision should army needs require a further release of men; or should it develop that some of the occupations might later be undertaken by women or older men. Those engaged in the occupations cited and within the age limits will be posted for military duty only after consultation with the local representative of the Government Department concerned.

Rubber Manufacture is given a special section, and the following classes of workers are protected when the individuals had attained on January 1, 1917, the age specified in brackets in each case or were engaged in the occupation (not necessarily with the same employer) on or before August 5, 1917:

HOSPITAL GOODS. Departmental foreman (23), cutter (25), molder (23), process workers (including calender hands) (23), stover (23), spreader (25), surgical tubing (maker of, including catheters) (23), vulcanizer (wet) (21), vulcanizer (dry) (25). Protection applies equally to men engaged in contracts for public and private hospitals.

OTHER RUBBER GOODS. Foreman (27), calender man (27), mixer (27), molder (27), spreader (27), hose maker (25), vulcanizer (wet) (21), vulcanizer (dry) (25), ring and washer cutter (25).

In the allied trades the following occupations are protected:

CANVAS HOSE PIPE MANUFACTURE. Tackler (28), tenter (28), weaver (28).

WOVEN BELTING MANUFACTURE. Stretcher (27), painter (27), finisher (27).

ASBESTOS MANUFACTURE. Skilled workmen only (23).

ELECTRICAL INSULATING MATERIAL MANUFACTURE. Skilled workmen only (applies to workmen of all ages).

ELECTRICAL WIRE AND CABLE MANUFACTURE. Skilled workmen only (applies to workmen of all ages).

MANUFACTURE OF ENGINE AND PUMP PACKINGS AND JOINTINGS. Skilled workmen (21).

This schedule confers no right of exemption from military service if skilled artificers needed by the army cannot be supplied from other sources or it is possible to find substitutes. Men having bad records of absence from work will obtain no protection by reason of their occupation.

"Rubber Machinery," Mr. Pearson's newest book, filled with valuable information for rubber manufacturers, is now ready for mailing. Price, \$6.

War News of the Rubber Industry.

THE participation of the rubber industry in the nation's war plans continues with the utmost enthusiasm. Preparedness in the great struggle for world freedom progresses without abatement along many lines, and in the opinion of leading rubber men will so continue until Allied arms are victorious.

The oversubscription of the two billion dollar Liberty Loan by \$1,035,226,850 showed the American will; the ease with which the Red Cross fund of \$100,000,000 was considerably exceeded showed the American heart. In both campaigns the rubber business was handsomely represented. And now the Rubber Trade Roll of Honor is beginning to show in a substantial manner individual American grit and determination. It does the heart good to study those names, to note the goodly proportion of native Americans among them, and also to realize what American ideals and institutions mean to our foreign-born population—that the United States is indeed the world's melting pot and that in this war, lovers of freedom, regardless of their origin, are to stand shoulder to shoulder fighting for the common cause.

Once more THE INDIA RUBBER WORLD urges its readers to cooperate in stimulating war enthusiasm by sending for publication particulars of all patriotic acts and movements, corporate and individual, in order that this permanent monthly record of what the American rubber industry is doing for the defense of liberty and justice may be complete.

THE LIBERTY LOAN.

Through the courtesy of Frederic C. Hood, treasurer, Hood Rubber Co., Watertown, Massachusetts, we are enabled to pub-

LIBERTY LOAN SUBSCRIPTIONS BY THE

COMPANY.	No. SUB- SCRIBERS.	TOTAL SUBSCRIPTIONS.
Acushnet Process Co., New Bedford, Mass.	36	\$7,000
American Mills Co., Waterbury, Conn.	198	24,900
American Steel & Wire Co., Worcester, Mass.	618	42,050
American Wringer Co., Woonsocket, R. I.	184	11,100
Anchor Webbing Co., Woonsocket, R. I.	47	7,850
Appleton, F. H. & Son, Inc., Boston, Mass. ....	...	10,250
Apsley Rubber Co., Hudson, Mass.	250	20,450
Archer Rubber Co., Milford, Mass.	15	11,000
Athol Mfg. Co., Athol, Mass.	2	400
Atlantic Rubber Co., Atlantic, Mass.	2	400
Bailey, C. J., Boston, Mass.	7	750
Bauman Rubber Co., New Haven, Conn.	12	650
Beacon Falls Rubber Shoe Co., Beacon Falls, Conn.	133	12,250
Blakesley Novelty Co., Bristol, Conn.	19	7,450
Boston Belting Co., Boston, Mass.	178	39,250
Boston Insulated Wire & Cable Co., Boston, Mass.	11	6,550
Boston Rubber Shoe Co., Malden, Mass.	1,838	85,970
Bourne Rubber Co., Providence, R. I.	100	10,000
Boston Woven Hose & Rubber Co., Cambridge, Mass.	1,021	100,000
Carr, F. S. Co., Framingham, Mass. ....	...	10,000
Carton Belting Co., Allston, Mass.	30	2,000
C. C. C. Fire Hose Co., Canton Junction, Mass.	4	700
Clapp, E. W., Rubber Co., Hanover, Mass.	61	3,950

lish the accompanying list of New England subscribers in the rubber trade. It will be recalled that at the request of Alfred L. Aiken, governor of the Federal Reserve Bank of Boston, Mr. Hood represented the rubber industry on a committee of New England manufacturers to promote the sale of the bonds among factory operatives, office and sales forces. To his enthusiastic initiative in working out a partial payment plan, circularizing every New England rubber concern and encouraging participation and cooperation, is due a goodly measure of credit for the handsome total of \$1,754,455 shown by the appended list. This is still incomplete, however, the returns from a number of factories of the United States Rubber Co. and several other firms not yet having been received. The final

total is expected to be well above \$2,-000,000.

Of the \$1,400,000 worth of bonds taken by employees of the United States Rubber Co., New York City, \$67,000 was subscribed by the Hartford, Connecticut, plant, \$125,000 at the Morgan & Wright plant, Detroit, Michigan, and \$560 at the Denver, Colorado, branch.

A vigorous campaign for subscriptions among employees of The Goodyear Tire & Rubber Co., Akron, Ohio, netted 12,700 persons who obligated themselves to purchase \$800,000

worth of bonds on the \$1 weekly instalment plan.

Twenty-seven nationalities were numbered among the 11,000 odd employees of The B. F. Goodrich Co., Akron, Ohio, who subscribed \$750,000.

Practically every employe of the Polack Tyre & Rubber Co., New York City, subscribed for at least one bond.

RUBBER INDUSTRY OF NEW ENGLAND.

	No SUB- SCRIBERS.	TOTAL SUBSCRIPTIONS.
Colton, Geo. S., Elastic Web Co., Easthampton, Mass.	36	\$3,800
Conant, Houghton & Co., Inc., Littleton, Mass.	30	2,150
Crandall Packing Co., Boston, Mass.	1	50
Converse Rubber Shoe Co., Malden, Mass.	508	30,000
Crocker Rubber Co., Brockton, Mass.	3	150
Davidson Rubber Co., Boston, Mass.	30	11,200
Davol Rubber Co., Providence, R. I.	176	21,500
Day, H. P. & E., Inc., Seymour, Conn.	120	19,450
Easthampton Rubber Thread Co., Easthampton, Mass.	38	10,000
Electric Cable Co., Bridgeport, Conn.	284	27,000
Elastic Tip Co., Boston, Mass.	6	1,200
Everlastik, Inc., Boston, Mass.	652	40,600
Feinberg, David Co., Chelsea, Mass.	3	1,000
Ferdinand, L. W. & Co., Boston, Mass.	3	1,150
Fisk Rubber Co., Chicopee Falls, Mass.	540	250,000
Fitchburg Rubber Co., Fitchburg, Mass.	2	150
Franklin Rubber Co., Boston, Mass.	5	500
Garlock Packing Co., Boston, Mass.	7	1,350
Glendale Elastic Fabrics Co., Easthampton, Mass.	176	10,150
Globe Rubber Works, Inc., Boston, Mass.	10	2,000
Goodrich, The B. F. Co., Portland, Me.	5	350
Goodrich, The B. F. Co., Providence, R. I.	6	550
Goodrich, The B. F. Co., Worcester, Mass.	4	250

The Rubber Trade Roll of Honor.

Reported by The Rubber Association of America.

Numbers in parenthesis following individual names indicate branches of service as shown by the key list on pages 642-643.

ACUSHNET PROCESS CO., NEW BEDFORD, MASSACHUSETTS.

H. S. Spooner (13) F. Silvia (13)
A. Belleveau (13) J. Dansereau (14)
J. Reindeau (13) A. Millette (15)

F. H. APPLETON & SON, INC., BOSTON AND FRANKLIN, MASSACHUSETTS.

U. S. ARMY.

R. McFarland John Muller
T. Campbell

MASSACHUSETTS STATE GUARD

Francis Hawks Appleton, Jr. Louis S. Guild
William S. Goodwin Arthur Mason
Fred L. Tufts Harry W. Corson
Arthur Wigglesworth

BATAVIA RUBBER CO., BATAVIA, NEW YORK.

H. Harris (7) A. Bloomer (17)
Floyd Blook (7) J. Cocco (17)
C. Griswold (5) S. Foster (82)
C. Bohm (16) Walter Gavriel (82)
Tom Zimarino (6) L. Hayes (17)
Elva Springer (5) F. Hollenbeck (82)
A. Klinkroth (7) E. Merrill (17)
M. Fisher (5)

BEACON FALLS RUBBER SHOE CO., BEACON FALLS, CONNECTICUT.

J. H. Caldwell (18) T. D. Cardow (20)
R. Wright (2) William Cardow (1)
Frank Kelleher (19) Steve Bernacki (21)
Rudolph Lafferty (19) Dominick Motsky (2)
William Young (19) Chas. J. Jones (82)
William Bulka (19) Everett W. Wright (82)
Ben Goldberg (19)

BOSTON WOVEN HOSE & RUBBER CO., CAMBRIDGE, MASSACHUSETTS.

U. S. NAVY.

George Donald Manuel Roderick
George Fisher Joseph J. Jones
Herbert Gordon Ralph J. Eaton
Chester Coolidge Fred N. Eaton

T. Grover (9) William Sullivan (1)
J. De Vellis (1) Walter Harvey (4)
E. B. Johnston (5) George Durham (3)
George Ahearn (18) Albert Morrissey (5)
John Lee (18) H. S. Royce (22)
David J. Walsh (4) James Tisdale (23)
John J. Alexander (1) R. Rowe (24)

BRIGHTON MILLS, PASSAIC, NEW JERSEY.

NEW JERSEY NATIONAL GUARD.

Alexander Silver George Conduis
John J. O'Brien Michael Reo
John Schneider John Freyland
Bruno Babbles Ivan Sorken
James Delaney Thomas Stewart
Thomas McCann Joseph Galetta
William Green Wasel Robeda
Gost Manuel John M. Martin
John Matz Cornelius Blum
Frank O'Neill Charles E. Sage

U. S. ARMY.

Stephan Kocilevsky Joseph McAteer
Michael Bolas Vincenza Yuppa
Paul Schichler Y. Kallienk
Eri Cihowsky Peter Tomas
John Novak John Himel
Thomas Matzel Sherley Richmand
Mike Pollak Stanley Wienclow
John Kollar Max Bayduk

James Hammond (25) Michale Markin (4)
Raymond Kievitt (25) Raymond P. Clarke (4)
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- 1 U. S. Army.
- 2 U. S. Navy.
- 3 Officers' Reserve Corps, Plattsburg, New York.
- 4 U. S. Naval Reserve.
- 5 U. S. Marine Corps.
- 6 U. S. Cavalry.
- 7 Aviation Corps.
- 8 U. S. Army Field Artillery.
- 9 Medical Corps.
- 10 Ambulance Corps.
- 11 Red Cross Ambulance Corp.
- 12 American Volunteer Ambulance Corps.
- 13 Massachusetts National Guard, Field Artillery.
- 14 Fort Slocum, New York.
- 15 Fort Ethan Allen, Vermont.
- 16 U. S. Navy Yeomanry.
- 17 New York National Guard, Field Artillery.
- 18 Massachusetts National Guard.
- 19 Connecticut National Guard.
- 20 Fort Wright, New York.
- 21 Polish Training School, Cambridge Springs, Pennsylvania.
- 22 Harvard Regiment.
- 23 Canadian Rifles.
- 24 Government Inspection.
- 25 Machine Gun.
- 26 New Jersey National Guard, Band.
- 27 Fort Meyer.
- 28 Ordnance Dept., Washington, D. C.
- 29 Wisconsin National Guard, Field Artillery.
- 30 Great Lakes Naval Training Station.
- 31 Rhode Island National Guard.
- 32 Coast Defense, New York National Guard.

33 New Jersey National Guard, Cavalry.
 34 New York National Guard, Engineers.
 35 New York National Guard, Cavalry.
 36 Ohio National Guard, Engineers.
 37 Ohio National Guard.
 38 District of Columbia National Guard.
 39 Maryland National Guard.
 40 Field Hospital Corps.
 41 Illinois National Guard.
 42 Pennsylvania National Guard.
 43 Virginia National Guard.
 44 Michigan National Guard.
 45 West Virginia National Guard.
 46 Missouri National Guard.
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 49 Florida National Guard.
 50 South Carolina National Guard.
 51 Coast Artillery.
 52 Surgeon, U. S. Navy.
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 54 Kentucky National Guard.
 55 Alabama National Guard, Field Artillery.
 56 North Carolina National Guard, Cavalry.
 57 Iowa National Guard, Engineers.
 58 Norfolk Navy Yard.
 59 Georgia National Guard.
 60 U. S. Reg. Motor Service.
 61 Rhode Island National Guard, Field Artillery.
 62 French Infantry Regiment.
 63 Fort Slocum, New York, Field Artillery.
 64 U. S. Receiving Ship, Brooklyn, New York.
 65 Vermont National Guard.
 66 Naval Training Station, Newport, Rhode Island.
 67 U. S. S. "Southey."
 68 Connecticut National Guard, Field Artillery.
 69 Connecticut National Guard, Naval Militia.
 70 Officers' Training Corps, New Haven, Connecticut.
 71 Coast Artillery Corps, Fort Adams, Newport, Rhode Island.
 72 U. S. Navy Recruiting Force, Hartford, Connecticut.
 73 U. S. S. "Georgia."
 74 U. S. S. "Nahma."
 75 Connecticut National Guard, Band.
 76 Massachusetts Coast Artillery.
 77 Kilties.
 78 Base Hospital, France.
 79 Aeroplane Reserve Corps.
 80 Medical Reserve Corps.
 81 New York National Guard, Coast Artillery.
 82 New York National Guard.
 83 U. S. S. "Kearsarge."
 84 American Field Service, Munitions Transport Drivers.

NO MORE DENTAL RUBBER FOR GERMANY.

Agents of the Department of Justice believe that the smuggling of dental rubber to Germany has finally been stopped. The story is an interesting one.

Strangely enough, while Germans and Frenchmen make wonderful physicians and surgeons, they are said to be abominable dentists. Certain it is that in Germany American dentists have the very cream of the business. The Kaiser himself patronizes one of a colony of about 15 in Berlin who charged extravagant prices, maintained pretentious establishments and had practically no competition.

When war was declared their supplies of dental rubber were cut off. The German Government commandeered almost all the rubber in the country and the British blockade ships seized rubber in every shape.

Then the dentists started smuggling it through from America. The dentist would send his wife to New York. She would get a quantity of dental rubber and make bargains for its transportation with stewards, probably on the lines between New York and Copenhagen.

These men carried large bundles aboard their ships at night. At Copenhagen the rubber was expressed to Berlin. Letters were sent over in the same way, both in violation of United States laws. Agents of the Department of Justice and of the Revenue Service shadowed some of the women and the traffic stopped.

RUBBER LEADS LONDON EXPORTS TO AMERICA.

The total value of declared exports from London to the United States for the five months ended May 31, 1917, amounted to \$78,779,911, compared with \$77,115,135 for the same period in 1916. Of these totals rubber amounted to \$20,696,269 and \$31,447,629 respectively. Although the total exports for the period have increased only about \$1,665,000, rubber shows a gain of nearly \$11,000,000, and in fact forms 40 per cent of all exports. No wonder U-boat commanders are disheartened!

A SHIP FOR RUBBER CARGOES.

THE recent complacency of large American manufacturers regarding crude rubber supplies finds explanation in the fact that the United States Shipping Board, in consultation with the Committee on Rubber of the Advisory Commission of the Council of National Defense, has arranged for the German steamship "Andalusia," which has been interned in Manila, Philippine Islands, since the beginning of the war, to be placed on berth from Hongkong and Nagasaki to carry rubber, hides, gunnies, etc., to Seattle, Washington. The ship will load at Singapore and probably be ready to leave during the latter part of August.

The former Hamburg-American Line steamship "Andalusia" was built in 1896 and is of 5,433 gross or 3,371 net tons. For insurance purposes she is rated first class. Inquiries regarding freight space, etc., should be addressed to Frank Waterhouse & Co., Seattle, Washington.

CHEMICALS IN LICENSED EXPORT LIST.

PRESIDENT WILSON issued a proclamation July 15, declaring it unlawful to export certain indispensable commodities from the United States, unless licensed to do so. Among the materials so prohibited, named in a revised list published July 22 by Secretary Redfield, may be noted chemicals and ingredients used in the rubber industry, as follows: Benzol, toluol, naphtha, benzine, gasoline, corn oil, linseed oil, ammonia salts, rosin, sulphur and turpentine.

It is more than likely that other materials may be placed on this list under future executive proclamations. Among them it is thought that cotton and its manufactures are likely to be included.

Applications for licenses may be made to the Bureau of Foreign and Domestic Commerce, Division of Export Licenses, 1435 K street, Washington, D. C., or to any of the branches of the Bureau of Foreign and Domestic Commerce—New York, Boston, Chicago, St. Louis, New Orleans, San Francisco and Seattle.

In applying for a license to export any of the commodities covered by the President's proclamation, applicants should give the following information in triplicate form:

- a. Quantity.
- b. Description of goods.
- c. Name and address of consignee.
- d. Name and address of consignor.

The license will be good for only 60 days and at the expiration of that time must be renewed, and if not shipped within that time a new application must be made.

The various branch offices of the Bureau of Foreign and Domestic Commerce have been given full instructions as to the disposition of all applications for licenses.

It is the desire of the Bureau of Foreign and Domestic Commerce to minimize the exporter's difficulties as much as possible, and therefore wherever practicable the district offices will be authorized to issue the licenses. It is thought, however, that many of the applications may have to be forwarded to Washington for decision.

The exporter receives his license in duplicate, and turns both copies over to the steamship company in exchange for a steamship permit. The steamship company turns both the original and duplicate over to the customs authorities with its clearance papers.

Difficulties arising where the goods covered by a license are not forwarded in one lot will be settled in one of several ways. In the first place, a man may apply for and receive as many licenses as he requires. A "balance license" is being arranged for, to take care of any balance of goods which has not been shipped under the original license. A "blanket

license" is being arranged for which will cover specific commodities shipped by specific firms to certain countries.

In the case of shipments to Canada, exporters are advised that steps have been taken to facilitate these shipments, and they need not apply for a specific license. Shipments to Canada may be forwarded as heretofore.

TOURING BUREAU INDICATES STRATEGIC ROADS.

SINCE the War Department has decided to purchase 70,000 trucks for the transportation of troops and supplies, military officials are busily engaged in choosing the best available routes between important points. The Goodrich National Touring Bureau which has carefully mapped, logged and guide-posted every principal road in the United States, recently offered the government complete access to its resources, and military inspection tours of strategic routes are already being conducted. Not long ago Captain O. R. Bird, U. S. N., with a sergeant, a corporal and a driver, dashed from Salt Lake City, Utah, to Los Angeles, California, in 34 hours and 14 minutes, proving that the new Arrowhead trail is the shortest route.

GERMAN GERMS IN PLASTERS.

THE statement issued by the Department of Justice that court and sticking plasters are being investigated for germs of infectious diseases placed there by German agents will startle some of the rubber manufacturers whose product is of the plaster kind. A large business is also done in porous plasters and corn plasters, the basis of the adhesive compound being india rubber. This is often compounded with medicaments for a variety of beneficent purposes. Instead of curative compounds it would be quite possible to substitute poisons. Nor would those who put powdered glass in Red Cross bandages hesitate in such wanton devilishness were the opportunity to occur. So watch their steps.

SIAM DECLARES WAR.

The kingdom of Siam, at the northern end of the Malay Peninsula, which for the ten months ended April 19 shipped 13,456 pounds of Para rubber and 12,533 pounds of gutta percha through the port of Singapore, has declared that a state of war exists with Germany and Austria. Nine steamers, aggregating 109,000 tons, have been seized. All Germans and Austrians have been placed under arrest and their places of business closed. The object of Siam's declaration is to "uphold the sanctity of international rights against nations showing contempt for the principles of humanity and respect for small states."

BREAKING THE FREIGHT CAR SHORTAGE.

Realizing that any feasible means to relieve the present freight situation will prove of benefit to the government as well as to business in general, the Railway Business Association of New York is promoting a widespread campaign among the trade associations and leading business houses of the country to break car shortage. Model forms are being distributed which are now in successful use by several concerns and deserve wider adoption. These include a blank for the shipper's weekly inbound loading and detention record, and a circular to the shipping department to be signed by the president of the company and setting forth the aims and means as follows:

What we can do:

(a) Get fuller carloading. The limit is 10 per cent above stencilled weight capacity.

(b) Increase excess of credits over debits. Don't use all your free time; load or unload earliest possible moment.

How we can do it:

1. Install forms similar to the attached and keep for each car loaded or unloaded a record of performance.

2. Talk often with our employes about this patriotic opportunity.

3. Report to me monthly for conference showing comparison with previous month and with corresponding month a year ago where data are available. This comparison should show average weight of carload and average pounds short of full carload inbound and out-bound, total credits, total debits, and total demurrage, names of consignors who have habitually underloaded, names of consignees who order short carloads.

4. Write for cooperation of consignors in fuller carloading and consignees in ordering full carloads.

Rubber companies should be willing to lend a hand in this important movement.

A TRUCK TIRE TEST.

An important question at the present time is whether solid or pneumatic tires are better for army trucks in the severe service which is required of them under war conditions. A practical test was recently made by the United States Tire Co., New York City, which certainly shows that the pneumatic tires are efficient and will stand service under the most difficult conditions. A 1½-ton Packard truck, heavily loaded, in fact, overloaded, equipped with 36 by 7-inch U. S. Nobby Tread pneumatic cord tires, was sent from Detroit, Michigan, to the Mexican border at Mission, Texas, a distance of 2,037 miles, and returning by a different route, completed the run of 4,288 miles. The trip was in regions where good roads were unknown, frequently plowing through 12 to 14 inches of soft clay, and in other places roads of intermixed mud and sharp stones were encountered. The intense heat of the desert had no apparent effect on the casings which resisted the cutting stresses of sharp rocks and the impacts of rock-bottomed streams. The test was made under the supervision of First Lieutenant J. W. O'Mahoney, formerly a United States motor truck transport expert, who since he was mustered out of the Federal service has continued his study of army transportation. The test seems to prove that pneumatics have some advantages over solid tires for trucks in heavy service.

RECREATION TENTS FOR OUR SOLDIERS.

The Tucker Duck & Rubber Co., Fort Smith, Arkansas, has received a contract from the international committee of the Y. M. C. A. for \$10,000 worth of tents, 40 by 80 feet, to be used in recreation places to be established for the benefit of American troops.

PRODUCTION OF ACETIC ACID IN CEYLON.

In view of the large quantities of acetic acid needed in the coagulation of latex, distillation experiments have been made with coconut shells and vera or virai wood. The results from the former were so satisfactory—the yield being 8 to 12 per cent of pure acetic acid, besides creosote, useful for smoked rubber—that many planters who grow both rubber and coconuts have installed small stills for distilling coconut shells and now produce all the acetic acid they need. Vera wood, the product of a shrub, yielded 4.14 per cent of pure acetic acid. The crude liquor could be utilized in the manufacture of smoked sheet or the darker rubbers; by redistilling it, after the addition of fresh charcoal, a pale yellow, clear solution of acetic acid was produced and could be employed for ordinary crêpe rubber. The erection of a small plant for the distillation of vera wood is being considered.

THAT RUBBER IS IN CERTAIN RESPECTS STRONGER THAN STEEL IS indicated by a unique test made at the Diamond tire factory. A sand blast under enormous pressure was blown on a piece of rubber and a piece of steel. The rubber actually outwore the steel three to one.

Bowers' Specific Gravity Tables.

THE determination of the weight of rubber articles is a matter of calculation well known to every rubber mill superintendent. It is upon these figures that factory costs are based and are therefore fundamental factors in the manufacture of mechanical rubber goods. According to the usual method the respective volumes of the articles to be produced are computed. Then the weight is determined for each article according to the specific gravity of the particular stock to be used in the goods. These determinations require a high order of technical as well as practical knowledge in the calculation of dependable figures. Moreover, the amount of time consumed is considerable, and human fallibility ever supplies the possibility of costly error in making complex computations.

A set of tables has been carefully designed to simplify the necessary calculations in determining the weights in ounces or pounds of rubber solids of regular dimensions, including disks, cylinders, square strips and sheets. As a short-cut method these tables will be of decided value to superintendents of rubber mills and by their use intelligent salesmen will be able promptly to answer customers' questions regarding the weight of a desired article.

The complete table with instructions, and several concrete examples of the method to be observed in computing the weights of disks and kindred articles are here shown. The tables for cylinders, square strips and sheets will be published in subsequent issues.

Various bases are used to reduce the number of decimals and still retain a true proportion throughout the table.

The stated base of the disk table is 62.40 pounds per cubic foot. The unit used is .000001731 ounce, equals a disk 1/64 in. diameter 1/64 in. thick—Specific gravity 1.00.

$$\begin{array}{r} .000001731 \text{ ounce} \times (12 \times 64)^3 \\ \hline .7853982 \times 16 \end{array} = 62.40 \text{ pounds.}$$

Weight of one cubic foot of water—39.1° F. (maximum density)—62.425 pounds. (Kent, 1916 edition, page 27.)

To convert disk table into weights according to above standard, multiply by 1.0004+ or divide by 0.99958+.

The disk table is constructed to read from 1/64 in. diameter to 48 in. diameter (and above) as follows:

1/64 in. to 2 in. by 64ths in ounces
1/32 in. to 6 in. by 32nds in ounces
1/16 in. to 12 in. by 16ths in pounds
1/8 in. to 24 in. by 8ths in pounds
1/4 in. to 48 in. by 4ths in pounds

The volumes of two similar solids are to each other as the cubes of their linear dimensions. (Kent, 1916 Edition, Page 62.)

1 1/64 in. = .007313475 ounce	
2	4
2 1/32 in. = .02925390 ounce	
2	4
4 1/16 in. = .117015600 ounce = .007313475 pound	
2	4
8 1/8 in. = .029253900 pound	
4	4
16 1/4 in. = .117015600 pound	

The scope of the disk table is partly shown in the following examples that are intended to demonstrate the method employed when using the table which will be found on another page. The samples selected for computation include gaskets of two different sizes, a square flange ring, a valve, a washer, a ball valve and corks and plugs.

SAMPLE.

Gasket—45 1/4 in. diameter, 41 in. hole, 3/8 in. thick, Specific Gravity 1.62.

COMPUTATION.

45 1/4 in. = 11 5/16 in.	=	.056709291 pound
41 in. = 10 1/4 in.	=	.046556976
		.010152315
		16
		60913890
		10152315
45 1/4 in. x 41 in. x 1/64 in.	=	.162437040
		1.299496320
		1.62
		2598992640
		7796977920
		1299496320
		2.10518403840 pounds, or 210 1/2 pounds per 100.

SAMPLE.

Gasket—23 1/8 in. diameter, 20 in. hole, 3/32 in. thick, Specific Gravity 1.68.

COMPUTATION.

23 1/8 in. = 11 9/16 in.	=	.058243475 pound
20 in. = 10 in.	=	.044313600
		.014929875
		4
		.059719500
23 1/8 in. x 20 in. x 3/32 in.	=	.358317000
		1.68
		2866536
		2149902
		358317
		.60197256 pound, or 60 pounds per 100.

SAMPLE.

Square Flange Ring—11 1/2 in. diameter, 11 in. hole, 1 in. square flange, Specific Gravity 1.71.

COMPUTATION.

11 1/2 in.	=	.058604736 pound
11	=	.053619456
		.004985280
		16
		29911680
		4985280
		.079764480
		1.71
		79764480
		558351360
		79764480
		.13639726080 pound, or 13 3/4 pounds per 100.

For round flange rings.—The use of 80 per cent of the weight of its circumscribing square flange ring will be found practical.

SAMPLE.

Valve—5 3/4 in. diameter, 5/8 in. thick, 11 1/16 in. hole, Specific Gravity 1.67.

COMPUTATION.

5 3/4 in.	=	.014651184 pound
11 1/16 in.	=	.000209451
		.014441733
		.40
		.577669320
		1.67
		404368524
		346601592
		57766932
		.014707044 pound, or 96 1/2 pounds per 100.

APPROXIMATE WEIGHTS OF DISKS 1/64 INCH THICK

SPECIFIC GRAVITY 1.00

COMPILED BY GEORGE W. BOWERS

BASIS - Cubic Foot = 62.40 Lbs. Avd.

Diameter in Inches.	Pounds per Piece.		Diameters in Inches.	Pounds per Piece.		Diameters in Inches.	Pounds per Piece.	
	Ounces per Piece.	Diameters in Inches.		Ounces per Piece.	Diameters in Inches.		Ounces per Piece.	Diameters in Inches.
12	063811584	3	8	028360704	2	4	007090176	1
11 15/16	063148611	2 63/64	7 15/16	027919299	1 63/64	3 15/16	006870339	63/64
11 7/8	062489100	2 31/32	7 7/8	027481356	1 31/32	3 7/8	006653964	31/32
11 13/16	061833051	2 61/64	7 13/16	027046875	1 61/64	3 13/16	006441051	61/64
11 3/4	061180464	2 15/16	7 3/4	026615856	1 15/16	3 3/4	006231600	15/16
11 11/16	060531339	2 59/64	7 11/16	026188299	1 59/64	3 11/16	006025611	59/64
11 5/8	059885676	2 29/32	7 5/8	025764204	1 29/32	3 5/8	005823084	29/32
11 9/16	059243475	2 57/64	7 9/16	025343571	1 57/64	3 9/16	005624019	57/64
11 1/2	058604736	2 7/8	7 1/2	024926400	1 7/8	3 1/2	005428416	7/8
11 7/16	057969459	2 55/64	7 7/16	024512691	1 55/64	3 7/16	005236275	55/64
11 3/8	057372264	2 27/32	7 3/8	024102444	1 27/32	3 3/8	005047596	27/32
11 5/16	056709291	2 53/64	7 5/16	023695659	1 53/64	3 5/16	004862379	53/64
11 1/4	056084400	2 13/16	7 1/4	023292336	1 13/16	3 1/4	004680624	13/16
11 3/16	055462971	2 51/64	7 3/16	022892475	1 51/64	3 3/16	004502331	51/64
11 1/8	054845004	2 25/32	7 1/8	022496076	1 25/32	3 1/8	004327500	25/32
11 1/16	054230479	2 49/64	7 1/16	022103139	1 49/64	3 1/16	004156131	49/64
11	053619456	2 3/4	7	021713664	1 3/4	3	003988224	3/4
10 15/16	053011875	2 47/64	6 15/16	021327651	1 47/64	2 15/16	003823779	47/64
10 7/8	052407756	2 23/32	6 7/8	020945100	1 23/32	2 7/8	003662796	23/32
10 13/16	051807099	2 45/64	6 13/16	020566011	1 45/64	2 13/16	003505275	45/64
10 3/4	051209904	2 11/16	6 3/4	020190384	1 11/16	2 3/4	003351216	11/16
10 11/16	050616171	2 43/64	6 11/16	019818219	1 43/64	2 11/16	003200619	43/64
10 5/8	050025900	2 21/32	6 5/8	019449516	1 21/32	2 5/8	003053484	21/32
10 9/16	049439091	2 41/64	6 9/16	019084275	1 41/64	2 9/16	002909811	41/64
10 1/2	048855744	2 5/8	6 1/2	018722496	1 5/8	2 1/2	002769600	5/8
10 7/16	048275859	2 39/64	6 7/16	018364179	1 39/64	2 7/16	002632851	39/64
10 3/8	047699436	2 19/32	6 3/8	018009324	1 19/32	2 3/8	002499564	19/32
10 5/16	047126475	2 37/64	6 5/16	017657931	1 37/64	2 5/16	002369739	37/64
10 1/4	046556976	2 9/16	6 1/4	017310000	1 9/16	2 1/4	002243376	9/16
10 3/16	045990939	2 35/64	6 3/16	016965531	1 35/64	2 3/16	002120475	35/64
10 1/8	045428364	2 17/32	6 1/8	016624524	1 17/32	2 1/8	002001036	17/32
10 1/16	044869251	2 33/64	6 1/16	016286979	1 33/64	2 1/16	001885059	33/64
10	044313600	2 1/2	6	015952896	1 1/2	2	001772544	1/2
9 15/16	043761411	2 31/64	5 15/16	015622275	1 31/64	1 15/16	001663491	31/64
9 7/8	043212684	2 15/32	5 7/8	015295116	1 15/32	1 7/8	001557900	15/32
9 13/16	042667419	2 29/64	5 13/16	014971419	1 29/64	1 13/16	001455771	29/64
9 3/4	042125616	2 7/16	5 3/4	014651184	1 7/16	1 3/4	001357104	7/16
9 11/16	041587275	2 27/64	5 11/16	014334411	1 27/64	1 11/16	001261899	27/64
9 5/8	041052396	2 13/32	5 5/8	014021100	1 13/32	1 5/8	001170156	13/32
9 9/16	040520979	2 25/64	5 9/16	013711251	1 25/64	1 9/16	001081875	25/64
9 1/2	039993024	2 3/8	5 1/2	013404864	1 3/8	1 1/2	000997056	3/8
9 7/16	039468531	2 23/64	5 7/16	013101939	1 23/64	1 7/16	000915699	23/64
9 3/8	038947500	2 11/32	5 3/8	012802476	1 11/32	1 3/8	000837804	11/32
9 5/16	038429931	2 21/64	5 5/16	012506475	1 21/64	1 5/16	000763371	21/64
9 1/4	037915824	2 5/16	5 1/4	012213976	1 5/16	1 1/4	000692400	5/16
9 3/16	037391331	2 19/64	5 3/16	011924859	1 19/64	1 3/16	000624891	19/64
9 1/8	036897996	2 9/32	5 1/8	011639244	1 9/32	1 1/8	000560844	9/32
9 1/16	036394275	2 17/64	5 1/16	011357091	1 17/64	1 1/16	000500259	17/64
9	035894016	2 1/4	5	011078400	1 1/4	1	000443136	1/4
8 15/16	035397219	2 15/64	4 15/16	010803171	1 15/64	15/16	000389475	15/64
8 7/8	034903884	2 7/32	4 7/8	010531404	1 7/32	7/8	000339276	7/32
8 13/16	034414011	2 13/64	4 13/16	010263099	1 13/64	13/16	000292539	13/64
8 3/4	033927600	2 3/16	4 3/4	009998256	1 3/16	3/4	000249264	3/16
8 11/16	033444651	2 11/64	4 11/16	009736875	1 11/64	11/16	000209451	11/64
8 5/8	032965164	2 5/32	4 5/8	009478956	1 5/32	5/8	000173100	5/32
8 9/16	032489139	2 9/64	4 9/16	009224499	1 9/64	9/16	000140211	9/64
8 1/2	032016576	2 1/8	4 1/2	008973504	1 1/8	1/2	000110784	1/8
8 7/16	031547475	2 7/64	4 7/16	008725971	1 7/64	7/16	000084819	7/64
8 3/8	031081836	2 3/32	4 3/8	008481900	1 3/32	3/8	000062316	3/32
8 5/16	030619659	2 5/64	4 5/16	008241291	1 5/64	5/16	000043275	5/64
8 1/4	030160944	2 1/16	4 1/4	008004144	1 1/16	1/4	000027696	1/16
8 3/16	029705691	2 3/64	4 3/16	007770459	1 3/64	3/16	000015579	3/64
8 1/8	029253900	2 1/32	4 1/8	007540236	1 1/32	1/8	000006924	1/32
8 1/16	028805571	2 1/64	4 1/16	007313475	1 1/64	1/16	000001731	1/64

SAMPLE.

Washer— $\frac{3}{8}$ in. diameter, $\frac{3}{64}$ in. hole, 1 $\frac{1}{16}$ in. thick, Specific Gravity 1.78.

COMPUTATION.

$\frac{3}{8}$ in.	.000997056 ounce
$\frac{3}{64}$ in.	.000015579
	.000981477
	4
$\frac{3}{8}$ in. x $\frac{3}{16}$ in. x $\frac{1}{16}$ in.	.003925908
	1.78
	31407264
	27481356
	3925908
	.00698811624 ounce, or 7
	ounces per 1000.

Ball Valves.—The volume of a sphere is equal to $\frac{2}{3}$ of the volume of its circumscribing cylinder. (Kent, 1916 Edition, Page 62.)

SAMPLE.

Ball Valve—1 $\frac{1}{64}$ in. diameter, Specific Gravity 1.58.

COMPUTATION.

1 $\frac{1}{64}$ in.	=	.007313475 ounce
		65
		36567375
		43880850
3)		.475375875
		158458625
		.316917250
		1.58
		2535338000
		1584586250
		316917250
		.50072925500 ounce, or $\frac{1}{2}$
		ounce each.

Corks, Plugs, etc.—To find the volume of a frustrum of a cone—add together the areas of the two bases and a mean proportional between them, and multiply the sum by one-third of the altitude. (Kent, 1916 Edition, page 62.)

SAMPLES.

Corks or Plugs—3 in. top diameter, 2 in. bottom diameter, $2\frac{3}{4}$ in. long, $\frac{5}{8}$ in. hole, Specific Gravity 1.58.

COMPUTATION.

3 in.	=	.003988224 pound
2 in.	=	.001772544
$2\frac{1}{2}$ in.	=	.002769600
3)		.008530368
		.002843456
		.000173100
$\frac{5}{8}$ in. hole	—	.002670356
		176
$2\frac{3}{4}$ in. = 176/64 in	=	16022136
		18692492
		2670356
		.469982656
		1.58
		3759861248
		2349913280
		469982656
		.74257259648 pound, or $74\frac{1}{4}$
		pounds per 100.

REDUCING THE LABOR TURNOVER.

"New Men for Old, the Hiring and Firing Problem in Industry," is the title of an article by Lillian Erskine and Treadwell Cleveland, Jr., in "Everybody's Magazine," and reprinted for distribution by the Chamber of Commerce of the United States of America, that merits the attention of every employer, especially at this time when the war has forced the great cost of the labor turnover into prominence. Never has there been a better exposition of the cost of this turnover in instruction, damage to equipment, lowered production and spoiled work, nor of where the blame rests. A convincing case is argued for the fact that the real product of a factory is not materials but men, and 16 essentials are stated for standardizing the turnover and reducing it to the minimum. A study of the means advocated as tending toward the elimination of this costly economic and social waste indicates that leading American rubber industries have already adopted many of them with gratifying results.

RUBBER HEELS AT THE SHOE FINDERS' CONVENTION.

THE National Leather & Shoe Finders' Association held its regular convention at Milwaukee, Wisconsin, July 10, 11 and 12. A portion of its session included a meeting of the Rubber Heel Club of America, which is composed of manufacturers of rubber heels and soles, the special purpose of this club being to bring about a spirit of cooperation among these manufacturers and to further the sale and use of rubber in place of sole leather.

Robert H. Cory, of the O'Sullivan Rubber Co., New York City, president of the Rubber Heel Club, stated that it is estimated that 10 per cent of the residents of New York City wear rubber heels. Allowing for the consumption of three pairs of heels per year per wearer, and applying these figures to the population of the country at large, disclosed the possibilities of merchandising 30,000,000 pairs of rubber heels annually through the country.

George A. Stetson, of the Elastic Tip Co., Boston, Massachusetts, the secretary of the club, reported that a great deal has been accomplished in promoting amicable relations between the members of the club and the Finders' Association and that he felt certain that as the work of both bodies became better understood, greater progress would be made in the future.

C. H. Oakley, of the Essex Rubber Co., Trenton, New Jersey, a director of the Rubber Heel Club, stated that the relations between the rubber heel and shoe finders' organizations had been established on a most satisfactory basis. The members of the Rubber Heel Club met several times during the year and the result has been that relationships have been established so that three-quarters of all the manufacturers of rubber heels discuss their trade problems with the utmost freedom and candor. He said that only by the elimination of wasteful manufacturing and foolish business methods can it be possible for merchandise of acceptable quality to reach the consumer with a fair margin of profit to all parties concerned in the trade.

During the convention the following resolution was passed by the National Leather & Shoe Finders' Association:

Resolved: That the National Leather and Shoe Finders' Association endorses and approves of the organization purposes and methods of the Rubber Heel Club of America and urges co-operation with its efforts to create and extend the use of rubber heels and to further the mutual interests of manufacturers, distributors and users of rubber heels.

An important action at this convention was the appointment of an educational committee and the raising of a sum of over \$20,000 for an educational campaign, to be carried into effect by an educational director to be appointed by this committee.

A feature of the convention was the address of Frank W. Whitcher, a leading Boston shoe findings manufacturer and jobber, and proprietor of the Velvet rubber heels, whose analysis of the present trade situation was very thorough, and instructive. Mr. Whitcher is an ex-president of the Finders' Association and for several years held the office of treasurer, resigning at this session because of the pressure of his duties in connection with the National Chamber of Commerce.

VENTILATED RUBBER COATS?

NOW it is an acid-proof textile fabric that is wanted; this to be used for the clothing of workmen employed in chemical plants producing, or using, acids. Cotton and other vegetable fibers are useless, and wool fabrics disintegrate very quickly. Rubber effectively resists the strongest mineral acids, but rubber suits are not comfortable and rubber is therefore used only for gloves and boots. Perhaps a wool cloth impregnated with rubber in such a manner as to render it sufficiently pliable, and yet wear-resisting, may be developed. [Textile World Journal.]

What the Rubber Chemists Are Doing.

SYNTHETIC RUBBER.

IN a comprehensive article in "Metallurgical and Chemical Engineering" (May 1, 1917), Andrew H. King illustrates the possibilities should synthetic rubber be obtainable commercially, by comparison with the case of synthetic indigo, which has completely displaced indigo from natural sources.

The present state of knowledge on the structure of the caoutchouc molecule is given in historical review, following by formulas, discussions of polymerization, methods of preparation of butadiene, condensation, opening the benzene ring, fermentation and dehydration.

This is the concluding article of a series of three, the object of which is to point out that if the seas are ever closed for the importation of our rubber supply there are only three ways to protect ourselves.

1. Cultivate and harvest guayule by scientific methods.
2. Develop something from milk weed or related plants.
3. Work up a good synthetic rubber.

METHODS FOR TESTS OF CHICLE.

The following methods by Dr. Frederic Dannerth are condensed from "The Journal of Industrial and Engineering Chemistry" (July, 1917).

Chicle is valued on the basis of the following factors: (1) Contained moisture; (2) shrinkage, when cleaned of dirt and bark; (3) chewing quality of purified chicle; (4) color of the crude chicle.

Typical analysis of Yucatan chicle:

	Per Cent
Acetone-soluble matter (resins)	40.3
Gums and carbohydrates	17.4
Protein	0.6
Sand and foreign matter	3.8
Water	38.0
Mineral matter (ash)	4.7

Crude chicle is sampled by cutting one pound from the block. This is rapidly cut into half-inch crumbs and stored for test sealed in a "Lightning Jar." Wet chicle cannot be thus stored more than one week, as molds grow rapidly, especially in the dark.

MOISTURE.

A half grain of crude chicle is dried in an air bath about five hours and not exceeding 50 degrees C. A glass dish two or three inches in diameter with ground glass lid is used for the sample. Fusion retards evaporation of the water. Drying is complete when two consecutive weighings agree within one-half per cent.

Moisture in crude chicle may be determined simultaneously with the resins. Boiling acetone removes resins and water from the sample. The extract in the flask is dried at 105 degrees C. and the residue in the thimble is dried in a similar manner. The sum of these weights subtracted from the weight of the original sample represents water. This method for determining moisture is preferred in practice.

VISCOSITY.

Kerosene (boiling point above 140 degrees C.) is used as the solvent as the loss by evaporation is negligible. Commercial chicle must be dried for 12 hours in a vacuum at not exceeding 70 degrees C. before solution.

Twenty grams of dry chicle, weighed to tenths of a gram, are placed in a wire basket fitted for a "Joint Rubber Committee" extraction apparatus. In the flask are placed 75 cc. of kerosene. The basket is made of 100-mesh wire gauze and retains any gritty and fibrous matter. The kerosene-chicle solution is diluted with kerosene to a concentration of 20 grams of strained chicle in 100 cc. of liquid. After cooling to 20 degrees

C. its viscosity is determined in a Stormer viscosimeter (THE INDIA RUBBER WORLD, December 1, 1916) and the result expressed in revolutions per minute.

RESINS.

The chewing quality of chicle is due to the presence of resins of suitable melting point. Mexican chicle has resin contents averaging 60.8 per cent of the dry chicle.

ACETONE SOLUBLE MATTER. Five grams of crude chicle, granulated to pass through one-eighth mesh screen, is extracted five hours in a Joint Rubber Committee extractor with acetone of boiling point not higher than 65 degrees C. The evaporated extract is dried to constant weight at a temperature not above 105 degrees C., cooled in a desiccator and weighed. The residue is dried at 85 degrees C. If the acetone solution is allowed to cool before distillation a large part of the resins separate out as a wax-like incrustation. After all the acetone is expelled and the temperature reaches 105 degrees C. the residual resins appear quite clear and amber colored.

MINERAL MATTER.

One to two grams of dry chicle are incinerated in a crucible inserted in an asbestos shield. The organic matter is volatilized at low temperature without ignition, after which the carbon is burned off as usual.

COLORED SPOTS ON RAW RUBBER.

B. J. Eaton, in the Agricultural Bulletin of the Federated Malay States, discusses the development of chromogenic organisms in dry rubber allowed to become damp. The colored spots referred to are designated as "spot disease" and have been determined experimentally to be due to the growth of chromogenic organisms induced by either rain or sea water wetting. Ten days after wetting dry, clean pale crêpe considerable development of colored organisms occurred, resulting in patches of orange, blue and yellow on the rubber. Dry, well-smoked sheet rubber may develop mildew on the surface for similar reasons, while low-grade rubbers may ferment and become tacky.

The author notes several interesting observations in the course of his investigations on the development of chromogenic organisms in rubber. No development of pigment occurs in "slab" rubber, which is slightly pressed coagulum, until the slab is cut open, when pigment develops on the cut surface after a few days. If sheet rubber is rolled into a cylinder straight from the sheeting machine, no development of pigment takes place until the sheet is cut open, when pigment develops on the cut surface. When wet, thin crêpe is rolled into a cylinder there is invariably a great production of pigment due to the growth of these organisms. From these experiments it seems that the presence of air is necessary for the development of chromogenic organisms, and this is excluded in rolled sheet or slab rubber. Also it is probable that an excess of moisture may retard or prevent the formation of the pigment, and that the pigment forms later with the reduction of the moisture.

VALUATION TESTS OF CRUDE RUBBER.

Scientific and rule-of-thumb valuing of plantation rubber have recently been compared by J. G. Fol for the Dutch Rubber Congress. The report of the investigation is published in the report of Department of Agriculture, Manufactures and Commerce, under the title of "Mededeelingen van dem Rijksvoorlichtingsdienst ten behoeve van den Rubberhandel en de Rubbernijverheid te Delft." There were 137 specimens, 36 samples of sheet, all but one of which were smoked, and 101 samples of crêpe, six of which were thick blanket. These were all judged in an empiric way by the producers and their conclusions reserved and com-

pared after completion of the scientific tests made without knowledge of the first results.

Empiric judging of rubber depends largely on color, smell and stretch. These tests at best are only roughly approximate, although the rubber expert by means of them can distinguish marked differences in quality. It is a mistake to presuppose that mechanical properties of the rubber when vulcanized run parallel to color, smell and stretch in the raw state. Variations in physical condition do not permit hand pulled tests nor quantitative expression of value. The influence of temperature variations are also marked.

Smoked sheet cannot be judged better by rule of thumb than crêpe. Its color denotes only the degree of smoking. Sheet is easier judged as to its mechanical properties than crêpe.

Black rubber presents the most difficulties for empiric judgment as it cannot be subjected to a hand test.

Scientific methods obviate these objections because each sample is suitably prepared and tested quantitatively. The 137 samples under investigation were examined after the following scheme:

A. CHEMICAL ANALYSIS:

1. Moisture.
2. Resin.
3. Ash.
4. Nitrogen calculated as albumen.
5. Rubber.
6. Acetic degree.

B. VISCOSITY NUMBER.

C. VULCANIZATION AND PHYSICAL TESTS:

1. Tensile strength.
2. Elongation.
3. Permanent set after 24 hours at 400 per cent stretch measured after six hours' rest.
4. Temporary set measured directly after release from 400 per cent stretch.
5. Determination of load necessary to stretch sample 400 per cent (kilograms per square centimeter).
6. Difference of the load necessary to stretch sample 400 per cent and that required for the last of five successive 400 per cent stretchings.
7. Elasticity or rebound.
8. Coefficient of vulcanization.

Concerning the importance and correlation of these determinations, it is concluded: (1) Chemical analysis is not sufficient alone for judgment of the rubber quality. Properties of rubber are chiefly determined by the physical nature of rubber and the rubber molecule. The quantitative chemical differences are not enough to account for the large differences found in the physical properties; (2) in general a high viscosity indicates good mechanical properties of the rubber after vulcanization. However, the opposite must be assumed with some reservation, since in studying the relation between the viscosity and tensile strength it appeared that various samples with a low viscosity had a very high tensile strength. The samples that exhibited this relation were almost exclusively smoked sheet. This phenomenon is caused by the fact that it is very difficult to dissolve smoked sheet in benzol completely. The dissolved part has a low viscosity and presumably contributes little to the excellent qualities shown by the sample after vulcanization, while the very considerable amount of undissolved rubber apparently is the most valuable part of the sample and most probably causes the good properties after vulcanization.

The *Voorlichtingsdienst* (Information Service) has taken the position that rubber which possesses good mechanical properties under certain normal vulcanization conditions, is better than that which may show these good properties only after prolonged vulcanization. It thus had to base judgment of the samples sent in on a determination of the mechanical qualities and of the coefficient of vulcanization of the rubber vulcanized according to a standard method.

Test samples for vulcanization were prepared with seven and one-half per cent of sulphur and were vulcanized one and one-half hours at three and one-half atmospheres.

The tensile strength, permanent set after stretching 400 per cent and the coefficient of vulcanization were taken as quantities suitable for classifying the samples. These quantities are closely related. Thus, high tensile strength generally accompanies high coefficient of vulcanization and low permanent set. Elongation at break also indicates the quality of the rubber; of samples equally loaded, that is, the best which has the highest elongation at break.

The remainder of the physical tests made were set aside as practically valueless for the end in view.

One of the most important points demonstrated by this investigation is the lack of uniformity in First latex rubber. The greatest divergencies were found in viscosity, tensile strength, permanent set and the coefficient of vulcanization. The causes of this lack of uniformity and its prevention is one of the most important problems of the rubber industry.

The rubbers investigated were classified as follows:

Class.	Breaking strain (kilograms per sq. c. m.)	Permanent set.	Coefficient of vulcanization.
I	135 k. g. and over	Maximum 5%	Minimum 5
II	120 k. g. to 135 k. g.	5% to 7%	Minimum 4
III	90 k. g. to 120 k. g.	7% to 12%	Minimum 3
IV	80 k. g. to 90 k. g.	Over 12%	Below 3
V	Below 80 k. g.	Over 12%	Below 3

The division of the 137 samples among the different classes is indicated below:

Class.	Sheet.	Crêpe.	Blanket.
I	17	3	6
II	12	21	3
III	7	51	2
IV	0	11	1
V	6	6	0
Totals	36	95	6

* One sample unsmoked.

These figures demonstrate clearly that, in general, smoked sheet is better than crêpe. However, there are samples of crêpe that are equal to smoked sheet as far as mechanical properties are concerned. The number of samples of blanket is too small to permit a decisive conclusion but the figures would indicate that blanket is inferior in quality to smoked sheet and often also to crêpe.

The empiric judgment of the rubbers by the contributors varied considerably in method. Seven contributors only, out of 15, sent in their judgment. Some arranged the rubbers in groups, others graded them and one sent the market values. From the last method it is seen that according to the prevailing system inferior crêpe is valued as highly as the best crêpe.

Lack of uniformity in plantation rubbers reveals itself chiefly in the difference in rapidity of vulcanization. Two rubbers outwardly of absolutely equal value may produce entirely different results after vulcanization. Empiric judgment cannot tell how a rubber will behave during vulcanization, hence the estimate of value is liable to be incorrect. This causes much uncertainty and disappointment to the manufacturer.

Another disadvantage which will be removed by the introduction of scientific methods of inspection is the putting together of equal lots of rubber coming from different plantations and possessing widely divergent properties.

The main advantages of the scientific system of grading rubber will be, (1) relatively better prices, especially of classes II and III, in comparison with those of hard fine Para; (2) improvement of the product of a good many estates, the managers of which grope in the dark at present; (3) increased use of plantation rubber, certain qualities of which are already as good, if not better than hard fine Para.

INFLUENCE OF PIGMENTS ON RUBBER.

In an article on pigments in rubber ("Journal of Industrial and Engineering Chemistry," July, 1917) Dr. Maximilian Toch states the nature and chemical effects on rubber of active compounding ingredients or "reinforcing pigments," such as antimony sul-

phide, litharge, sublimed zinc, lead, zinc oxide, lithopone, precipitated barium sulphate, carbon blacks and a few other well-known materials.

RUBBER IN AIR BRAKE AND SIGNAL HOSE.

The Master Car Builders' Association specifications for air brake and signal base prescribe standard methods of test and maximum and minimum test requirements as follows:

FRICTION.

The quality of friction rubber must be such that a 20-pound weight will not separate the duck plies of a one-inch wide section of hose more than eight inches in ten minutes.

TUBE AND COVER

STRETCH. Specimen one-half inch wide, gage marks two inches, is stretched twice to 800 per cent, re-marking two inches between stretchings and held stretched ten minutes the second time. After this treatment the rubber may show not over one-quarter inch temporary set and one-eighth inch permanent set between gage marks.

TENSILE STRENGTH. Specimen one-half inch, gage marks two inches. Breaking strength, minimum 800 pounds; maximum, 1,200 pounds per square inch.

METHOD OF ANALYSIS.

ESTIMATION OF MINERAL MATTER IN VULCANIZED RUBBER.

TWO grams of the sample are placed in a 300 cc. flat-bottom flask and covered with 50 cc. nitro-benzene. Connect the flask with a reflux air condenser (Hopkins preferred). Heat the flask until the rubber is completely dissolved, then allow the apparatus to cool. Dilute the contents with acetone, constantly stirring with a glass rod. Let stand for at least one hour to precipitate all mineral matter out of solution. Decant and transfer all to a filter paper and wash with acetone, then with alcohol. After a slight wash with water, dry at a low heat, weigh and calculate the percentage of mineral matter in the two grams of sample. The above method is by A. W. Jones, Jr., in "The Chemist-Analyst" (January, 1917).

CHEMICAL PATENTS.

THE UNITED STATES.

RUBBER VULCANIZING PROCESS. Adding to a mixture of rubber and sulphur, as an accelerating substance, a base of the aromatic series in which the anilin function or radical is in position para, with another radical or with the atom of carbon or triphenylmethane, and heating. [Etienne de Meeus, Beacon Falls, Connecticut, assignor to Beacon Falls Rubber Shoe Co., Boston, Massachusetts. United States Patent No. 1,229,724.]

LIQUID RUBBER COATING COMPOSITION. A liquid coating composition comprising Para rubber, gasoline, petroleum, oil of turpentine, linseed oil, China wood oil, white lead, red lead, sulphate of zinc and lead acetate. [Siegmond Jacobs, assignor of one-third to Charles Petrask, both of Cicero, Illinois. United States Patent No. 1,229,964.]

WATERPROOF COATING. A waterproofing composition comprising a mixture of asphalt, carnauba wax, ceresin, aluminum oleate and castor oil dissolved in or softened by a volatile solvent combined with a filler of finely divided Portland cement. [William H. Adams, Kenyon, Rhode Island. United States patent No. 1,231,687.]

WATERPROOF FILLER. A liquid waterproofing filler comprising in a combined mixture of forty-five parts, rubber cement, $4\frac{1}{2}$ parts; paraffin wax, $1\frac{1}{2}$ parts; turpentine, 2 parts; varnish makers' naphtha, 35 parts, and tri-chlorethylene, 2 parts. [Lewis A. Coleman, assignor to American Chemical & Manufacturing Co.—both of Norfolk, Virginia. United States patent No. 1,233,190.]

THE UNITED KINGDOM.

GUTTA PERCHA AND RUBBER SUBMARINE CABLES. Submarine telephone cables are insulated by gutta percha which has been partly or wholly deresinated and mixed with natural india rubber or its synthetic substitutes. [Felten & Guillaume Carlswerk Akt.-Ges., 24 Schangenstrasse, Mulheim-on-Rhine, Germany. British patent No. 105,573 (1917).]

VULCANIZING INDIA RUBBER. India rubber and its compounds and oil substitutes are vulcanized by means of finely ground oil shale. The sulphur in the shale acts as a vulcanizing agent, the hydrocarbons improve the product, and the siliceous matter acts as a filler. [G. E. Heyl, King's House, Kingsway, London. British patent No. 105,831 (1917).]

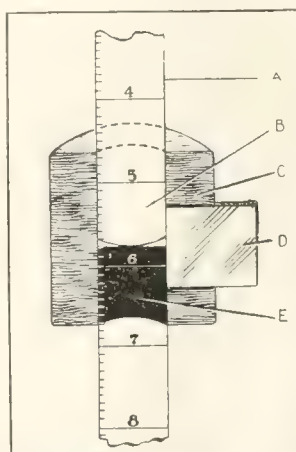
SWEDEN.

CAOUTCHOUC FROM BEARBERRY SHRUB (*Arctostaphylos uva-ursi*). The shrub is first extracted with water to remove tannin, dried and the caoutchouc removed by solution in benzene, ether, carbon bisulphide or other solvent and precipitated. [E. W. Tillburg, Swedish patent No. 42,227 (March 21, 1917).]

LABORATORY APPARATUS

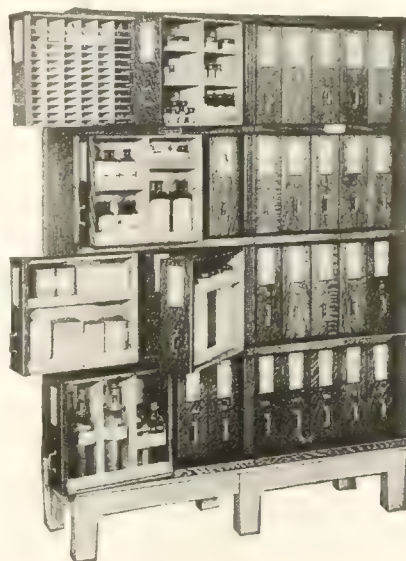
DEVICE FOR BURETTE READING.

A SIMPLE and easily made device for use in reading burettes is that originated by C. B. Clark, chemist of the Somerset Rubber Reclaiming Works. It is made in the form of a short half-cylinder of wood grooved to fit an ordinary burette. One half the groove is lined with white glazed paper and the other half with black glazed paper. A flat mirror, about three-quarters of an inch square, is set flush into one edge of the flat side, and is spaced equally with relation to the black and white lining of the burette groove. The method of use is indicated in the cut. The white section is applied against dark solutions and the black against light ones. The function of the mirror is to reflect light on the meniscus and graduations, thus rendering the reading of the scale very accurate, which is a very difficult matter in certain instances.



A—BURETTE; B—WHITE GLAZED PAPER; C—WOOD BLOCK; D—MIRROR; E—BLACK GLAZED PAPER.

FILING CABINET.



A very useful and convenient laboratory cabinet or filing system for chemicals, specimens and test pieces, known as the Schwartz Sectional System, is here illustrated. This arrangement keeps the materials filed in perfect condition, in a third of the usual shelf space. The contents of the cabinet are listed in a loose leaf index, reference to which instantly locates the chemicals or samples desired. [Indianapolis Drug Cabinet Co., Indianapolis, Indiana.]

New Machines and Appliances.

MACHINE FOR STAMPING NUMBERS ON METAL.

THE difficulty of obtaining metal specialties of various sorts, due to the congestion of orders in the metal industry, has been a serious handicap to many rubber mills. When the

necessity is urgent the manufacturers have been forced to supply their own requirements that were formerly obtained from makers of metal specialties.

As a case in point, the thin strip of tin or aluminum that is numbered consecutively and used in the molds for reproducing the number of the tire, may be made by the machine here shown. It is constructed on the same lines as a sub-press and is used in connection with an ordinary

power punch press. This machine will automatically emboss consecutive numbers on thin, soft metal, either on separate pieces or from a roll.

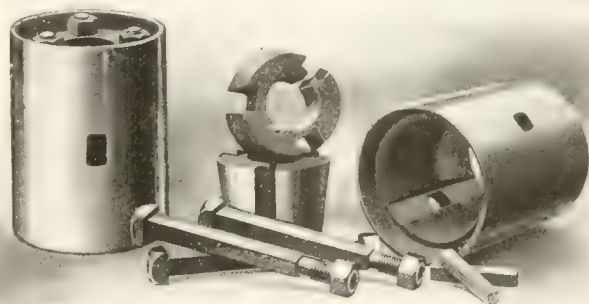
The numbering wheels are constructed on the principle of male and female dies and as the strip is automatically fed between them a raised number is formed on the metal at each stroke of the press. The numbering heads may also be constructed with any number of wheels and a letter wheel to follow or precede the number is supplied if so desired. Moreover, the machine can be constructed to duplicate or triplicate each number. [Wetter Numbering Machine Co., 255-61 Classon avenue, Brooklyn, New York.]

THE DOUBLE CONE VISE COUPLING.

The old-fashioned flange coupling is now seldom used, as it requires particular fitting to its individual shaft, must be tightly forced in place permanently and cannot be used on shafts in connection with other than split pulleys or open hangers. The modern type of compression coupling that possesses none of these objectionable features is here shown and has been specially designed to meet the particular requirements of rubber mill practice.

There are three principal parts—the outer sleeve or shell and two inner bushings or cones. The shell has its interior surfaces bored like the frustrums of two cones, having one continued axis. Into these are fitted the two cones, which have been previously bored of standard size to suit the shafts. When in place the axes of the cones must be coincident with that of the shell, thus under all conditions keeping the two shafts that are connected in true axial line, an exclusive feature of this coupling. The inner ends of the cones do not come together, their relative position being regulated by their external contact with the inner surface of the shell and their internal pressure upon the shafts to be coupled.

The shells have three equidistant longitudinal slots in their inner surface, while the cones have corresponding slots in their outer surface, through the bottom of which there is cut a narrow additional slot, which extends through to the bore, thus



parting the cone on this side. Into these main slots are pocketed the bolts, which serve alike to draw the cones toward each other and to prevent their turning in place.

The attachment and operation are readily understood. When the various parts have been placed—by hand—in proper position on the shafts, the bolts are inserted and gradually tightened. This screwing of the bolts exerts an equal pressure upon both cones, and as they are drawn along the inclined walls of the shells they are compressed, and exert a vise-like grip upon the entire circumference of the shafts to be coupled. As a slight drawing of the cone within the shell will make a perceptible compression of its diameter, and a subsequent contraction of its bore, it is evident that the shafts do not require to be fitted to the couplings, and that variation in the exact sizes of the shafts does not distort their true alinement.

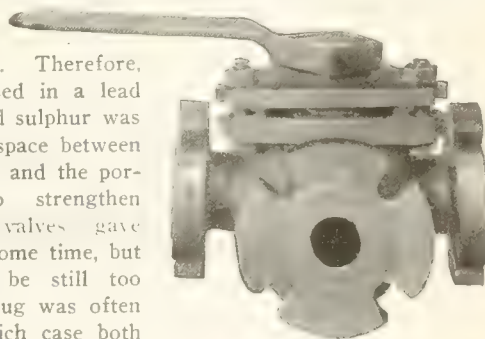
When the cones or their key seats become worn, the substitution of new cones renders the coupling practically new in every respect. [William Sellers Co., Inc., Philadelphia, Pennsylvania.]

ACID PROOF VALVES.

In the early days of the rubber reclaiming industry porcelain cocks were used on the acid lines in place of valves. These being exceedingly fragile it was necessary to provide some sort of covering to protect the porcelain against breakage. Therefore, they were enclosed in a lead casing and melted sulphur was poured into the space between the lead envelope and the porcelain cock to strengthen them. These valves gave satisfaction for some time, but were found to be still too fragile, as the plug was often fractured, in which case both plug and seat had to be replaced at considerable expense.

A trial was then made with the regular type of cast iron cock. This proved to be satisfactory for a while, but eventually the plug became stuck or "frozen" in the valve body owing to the corrosive action of the acids.

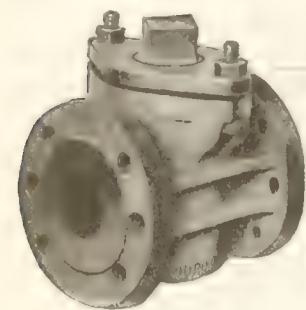
Valves that comprised a metal body lined with special acid-



resisting metal of the nature of lead were not altogether satisfactory, due to the difficulty of keeping the seat tight and the frequent trouble occasioned by the stem sticking in the body of the valve.

Fairly satisfactory results have been obtained by using the ordinary ammonia valve in which the steel disk usually furnished with these valves is substituted by a disk filled with soft lead that is easily renewed when it becomes worn and leaky.

In view of the evident difficulties in obtaining a suitable material for acid-resisting valves, it is interesting to note that a comparatively new alloy has been used with great success for this purpose. It is known as "Duriron," and is claimed to be impervious to the action of



nitric, sulphuric, acetic and many other acids in all degrees of dilution.

Prior to the advent of Duriron—about five years ago—there was no single metal from which acid valves and other chemical apparatus could be made which would resist corrosive and erosive action. Duriron is a hard, close-grained metal having a particularly uniform quality, taking a fine finish, and being practically non-corrodible. Valve seats made of it will hold their original condition of tightness for an indefinite length of time.

In many cases plug cocks possess advantages over valves, because they are quick and simple to operate. The main objection to this liability to stick or "freeze" has been overcome by plug cocks made of this metal, as experience has proven that they seldom if ever stick.

Duriron is employed in the form of castings, and on account of its exceeding hardness, its finished surfaces are machined by grinding. Many useful implements, utensils, pumps, containers, etc., are made of this material. [Duriron Castings Co., Dayton, Ohio.]

SECTIONAL STEEL SHELVING

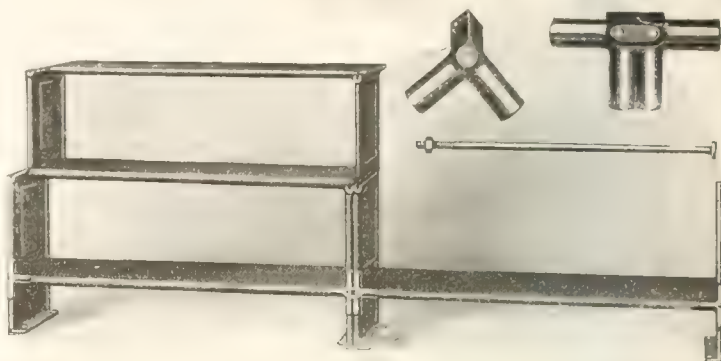
During the past few years there has been a growing demand for strong, interchangeable and portable shelving suitable for use in the office or plant of a rubber mill. Wooden shelving has failed to be generally accepted and therefore the development in this material has been slow. Sectional steel shelving of unit



construction that is sold at a comparatively moderate price has proved very satisfactory for both office and factory use.

This shelving, known as "Multi-Unit" shelving, is built of extra heavy sheet steel with the idea of making it available for heavy duty service in factories and in places where the shelving would

receive more or less rough usage. It can be arranged in sections by the multiplication of any number of units. All of the units solidly interlock and all parts are interchangeable which allows the greatest variety of arrangement. Another feature is that the



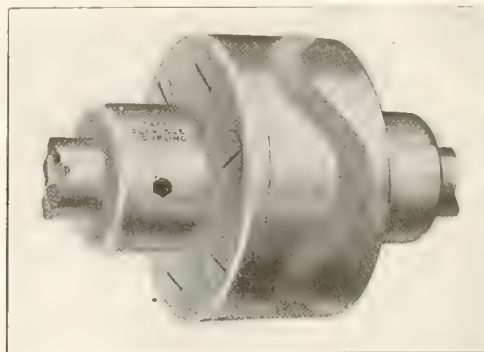
shelves and uprights have tubular edges, which serve not only to add to its strength but give it a very attractive appearance, especially when it is finished in the colored enamels.

The shelving is supplied in plain steel so that it can be painted at will, or it is furnished in a finish of black or olive green enamel. The uprights have paneled sides and the shelving is furnished with paneled backs, when backs are desired.

At the present time the units are furnished in standard size, 36 inches long, 12 inches high and 12 inches wide, and the standard stack, which is being put out at present, is five shelves high, but this can be arranged in any way to suit the purchaser's convenience. [National Scale Co., Chicopee Falls, Massachusetts.]

THE DAFT FLEXIBLE COUPLING.

There are many installations of machinery in rubber and other mills where the solution of the power transmission problem requires a flexible coupling. This is particularly true in connecting up generators, either to direct drives from counter shafts or in motor generator sets where a flexible connection is necessary to allow the armature to float in its true field. Also, on the mill line where sudden



shocks are of such frequent occurrence and errors of alignment often occur, some sort of flexible coupling is considered indispensable. Applied to calenders, the torque is rendered uniform and backlash effectively precluded by a flexible element provided on the drive shaft.

The Daft coupling here shown is of particular interest, due to the fact that its flexibility and driving power depend on a specially compounded rubber medium of novel form. Two types of this coupling are made; one is articulated to permit installing without disarranging the line, and the other is of the integral or solid type. The dielectric property of the rubber connection used in these couplings affords perfect insulation when they are used in connection with direct driven motors or generators. [Rubber Insulated Metals Corporation, Plainfield, New Jersey.]

POWERS' TEMPERATURE REGULATORS.

The control of temperature is a vital necessity in the manufacture of dependable rubber goods. The maintenance of the required degree of heat during the period of vulcanization determines the effectiveness of the cure and depends in a great measure on the automatic devices used for controlling vulcanizing temperatures. Also in steam heated dry rooms for drying crude rubber, compounding ingredients, and varnished rubber goods, temperature regulations are indispensable.

A type of temperature control that is recommended for these purposes is here shown. The thermostat, or sensitive bulb, is arranged in the heated space and transmits the changing vapor pressures through a flexible armored tube to a metallic diaphragm located in the bonnet of the steam valve. The expansion and contraction of the bellows opens or closes the valve, thereby regulating the supply of steam to the heater or dry room. Adjustment for different temperatures is accomplished by changing the position of the weight that slides on the valve lever. In vulcanizer and dry room installations, where temperatures above 120 degrees F. are used, the thermostat is, of course, located within the heated space while the valve is arranged on the outside. In varnish drying rooms where a temperature of 120 degrees F.

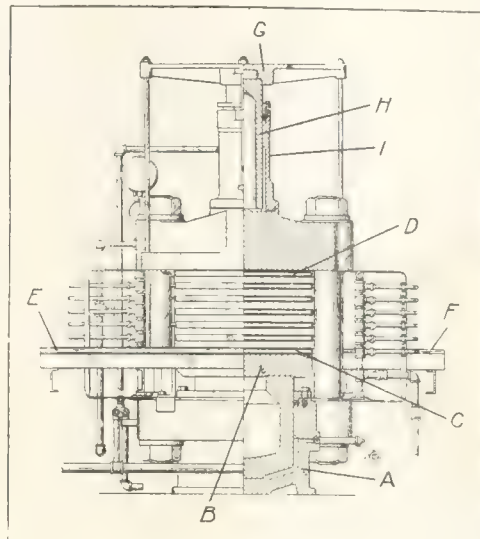
or less is to be maintained, the valve is located within the room. Where it is necessary for any purpose to maintain a certain degree of humidity, the regulator shown in the lower illustration and designed for the control of liquid temperatures, is used. The thermostat in this case, however, is immersed in the heated water tank and transmits the changes in pressure to the metallic diaphragm that opens and closes the steam valve, thereby regulating the water temperature. [The Powers Regulator Co., 5 South Wabash avenue, Chicago, Illinois.]

MACHINERY PATENTS.

GAMMETER'S VULCANIZING PRESS.

THE prime object of this invention is to provide a mechanically operated elevator whereby the loading and unloading of molds used in the manufacture of mechanical rubber goods is greatly facilitated. The illustration, representing a side elevation of the machine partly in section, comprises the hydraulic cylinder *A* forming the base in which operates a ram that supports the movable platen *B* on its upper end. Seven hot plates are provided, the lower one shown at *C* resting on the lower platen while the uppermost plate *D* is attached to the upper platen. The intermediate plates have varying degrees of vertical movement and are provided with means for stopping the plates at predetermined distances from each other to permit the insertion and withdrawal of the molds. All the hot plates are chambered for steam and connected to the supply line by flexible joints. On opposite sides of the press are two elevator platforms, *E* and *F*, suspended by four vertical rods from the yoke

G that is fixed to the ram *H*, which reciprocates in the cylinder *I* mounted on the head of the press.

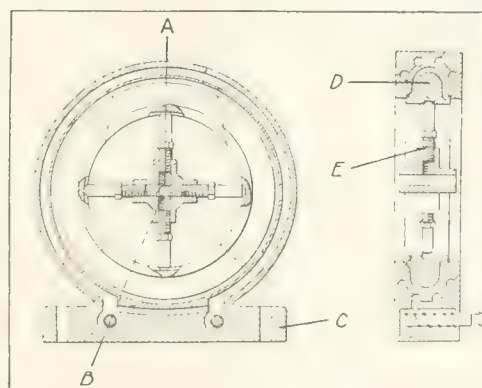


The press is opened by discharging the lower cylinder and the ram descends, thus opening the mold compartment. The press is then charged with the full complement of molds and pressure applied during the vulcanizing period. When the molds are to be changed

this may be effected with the aid of the elevators and by the operator on one side pushing an uncured mold into the compartment, thereby forcing out a cured mold onto the opposite platform. The molds may also be cured in pairs with overlapping curing periods, only two of the molds being changed at one time and the others remaining in the opened press, the substitution of the molds being greatly facilitated, meanwhile, by the movable platforms. [John R. Gammeter, Akron, Ohio, assignor of The B. F. Goodrich Co., a corporation of New York. United States patent No. 1,232,022.]

A SELF-CONTAINED TIRE VULCANIZING MOLD.

This novel mold is adapted to be used for building up the carcass of pneumatic tires and vulcanizing them without removal from the mold until the time has elapsed to effect the cure.



In the illustration, which shows a vertical section and an approximate section taken on the line *A, B, C* is the mold that is bolted to any convenient support and provided with heating chambers, *D* is the sectional core and

E the core expanding device comprising four adjusting screws.

In practical operation the various plies of frictioned fabric constituting the carcass are successively placed within the mold and shaped by hand and the heads applied. When this operation is finished the three straight sections of the core are mounted in place and finally the top or wedge-shaped section is introduced. The four screws of the expander being retracted, it is then located within the core, the heads of the screws alining with the channel grooves, and when the screws are expanded the core forces the casing against the walls of the mold. Any suitable means may be employed in curing, but in this instance electric heaters are introduced into chambers provided in the base of the mold for that purpose. [Fred Brown Pfeiffer, Akron, Ohio. United States patent No. 71,231,645.]

OTHER MACHINERY PATENTS.

THE UNITED STATES.

- 1,230,262. Machine for wrapping rubber tubes. I. Zwislser, assignor to The McGraw Tire & Rubber Co., both of East Palestine, Ohio.
- 1,230,415. Tire rolling machine. I. W. Kremer, Carlstadt, New Jersey.
- 1,230,789. Repair vulcanizer. J. B. Rose, assignor to The Marvel Accessories Manufacturing Co., both of Cleveland, Ohio.
- 1,230,847. Tire builder's tool. W. Thompson, assignor to Morgan & Wright—both of Detroit, Michigan.
- 1,232,764. Apparatus for manufacture of hollow rubber articles. J. W. Brundage, assignor to The Miller Rubber Co.—both of Akron, Ohio.
- 1,232,782. Machine for testing plastics. W. E. Field, assignor to The Hartford Rubber Works Co.—both of Hartford, Conn.
- 1,232,787. Fluid press for rubber footwear. J. R. Gammeter, Akron, Ohio, assignor to The B. F. Goodrich Co., New York City, a corporation of New York.
- 1,233,013. Device for decorticating fibrous leaves of plants. J. E. Askew, assignor of one-half to T. M. Fairbairn—both of San Antonio, Texas.
- 1,233,059. Cloth spreader or expander. A. Isherwood, Boston, Mass., assignor to T. Kenyon, Manchester, England.
- 1,233,079. Flexible core for tire strip forming machines. J. T. Lister, Cleveland, Ohio.
- 1,233,257. Automatic web guiding device. W. L. Lewis, Walpole, Mass.
- 1,233,260. Core jack. J. H. Mulloy, Detroit, Mich., assignor to Morgan & Wright, a corporation of Michigan.

THE UNITED KINGDOM.

- 105,426. Solid tire tubing machine. F. W. East, 1 Llanberis Villas, Tennyson Road, and A. G. East, Hugo Villa, Carlton Road—both in Harpenden, Hertfordshire.

THE DOMINION OF CANADA.

- 175,567. Machine for making rubber footwear. The Boston Rubber Shoe Co., Boston, assignor to W. Moore, Newton Highlands—both in Massachusetts, U. S. A.
- 175,568. Indicator for rubber mill rolls. Canadian Consolidated Rubber Co., Limited, Montreal, Quebec, assignee of G. E. Nettleton, Hartford, Connecticut, U. S. A.
- 175,636. Mold for rubber shoes. G. C. Clark, Mishawaka, Indiana, U. S. A.
- 175,920. Repair vulcanizer. E. Bellerose, Cohoes, New York, U. S. A.
- 176,005. Vulcanizing apparatus. Canadian Consolidated Rubber Co., Limited, Montreal, Quebec, assignee of C. J. Randall, Naugatuck, Connecticut, U. S. A.

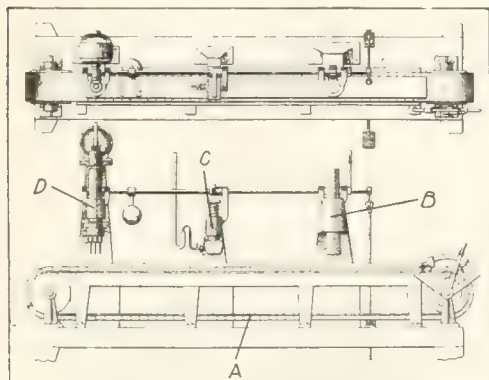
THE FRENCH REPUBLIC.

- 482,780 (September 5, 1916). Method and apparatus for manufacture of articles of hollow rubber. Else Aranas Co.
- 482,850 (September 13, 1916). Improvements in vulcanization apparatus. The Goodyear's Metallic Rubber Shoe Co.

PROCESS PATENTS.

PROCESS OF MAKING HEELS OR SOLES FROM SOLID TIRE SCRAP.

THE utilization of rubber scrap, such as solid tires, in the manufacture of rubber heels or soles and without further reclaiming, is the object of the present invention. The tires are first cut



into convenient lengths and clamped in a holder with the base portion exposed. This rough surface is ground off by an abrasive wheel, when the tire section is removed and placed in another holding device operating in connection

with a band saw that divides the tire longitudinally into slabs of suitable thickness. These flat strips are then delivered to the machine shown in side elevation and plan in the accompanying illustration. An endless conveyor belt *A*, moved intermittently by the ratchet wheel and hand lever shown on the right, carries the stock under a treadle-operated die press *B* that punches out the heel blank, but leaves it within the slab. As the slab advances each heel blank is branded with a heated die as it passes under the device shown at *C*, and the nail holes are finally

drilled by the multiple drill *D*, when the finished heels are carried from the machine by the conveyor belt. The periodic movement of this conveyor belt is obtained by a hand lever; the punching, branding and drilling operations are performed in unison by a foot treadle, while the drills are driven by a small electric motor. [Frederick D. Philip, Royal Oak, assignor of one-half to Allen A. Templeton, Detroit—both in Michigan. United States patent No. 1,230,510.]

POROUS RUBBER FABRIC. Open mesh fabric is coated and partially impregnated with rubber solution, after which the coating is perforated at the interstices by fluid pressure, the solvent evaporated and the rubber vulcanized. [Arthur B. Kempel, Akron, Ohio, assignor to The B. F. Goodrich Co., a corporation of New York. United States patent No. 1,229,284.]

OTHER PROCESS PATENTS.

THE UNITED STATES.

- 1,230,867. Hose and the process of making the same. H. Z. Cobb, Winchester, Mass., assignor to Revere Rubber Co., Olneyville, Rhode Island.
- 1,232,110. Process for the manufacture of tapered air-chamber sections. T. Sloper, Devizes, England.
- 1,232,374. Process of manufacturing yarn from fibers which are too slippery to be successfully spun in their normal condition consisting in treating the fibers with a mobile solution of rubber. W. E. Muntz, London, England.
- 1,232,573. Process of treating soles of rubber. C. Lee, Naugatuck, Conn., assignor to The Goodyear's Metallic Rubber Shoe Co., a corporation of Connecticut.

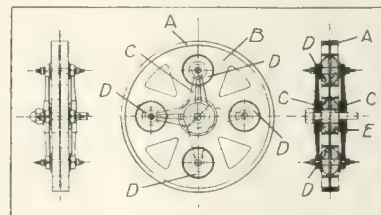
THE DOMINION OF CANADA.

- 175,798. Rubber preparation. H. Hunter, Indianapolis, Indiana, U. S. A.
- 176,009. Plastic vulcanizing process. Canadian Consolidated Rubber Co., Limited, Montreal, Quebec, assignee of C. J. Randall, Naugatuck, Connecticut, U. S. A.

MISCELLANEOUS PATENTS.

FRENCH RUBBER CUSHIONED WHEEL.

THIS is a wheel of the disk type that is evidently designed for military motor trucks, wagons and gun carriages. Referring to the illustrations, the wheel comprises a metal tire *A* that may be rubber shod, two side plates or disks *B* and two star-shaped pieces *C* that hold the four rubber cushions *D* and the rubber hub *E* in place. Metal rings encircle the four outer rubber cushions that are held in place by the two star-shaped pieces and four compression bolts. The rubber hub cushion is also provided with an outer metal band and is supported on the axle of the wheel by a metallic sleeve through which the axle bolt passes. [G. Constani. French patent No. 482,308.]



The affairs of the defunct Northland Rubber Co. were closed in the Supreme Court on July 17, when Justice Sears confirmed the receiver's report by which the creditors of the company will realize about 70 cents on the dollar, while the stockholders will suffer a total loss according to statements made to the court. The plant was recently sold to the Kelly-Springfield Tire Co. for \$270,000.

The Scioto Rubber Co., of Columbus, Ohio, has filed a damage claim against that city for \$24,500 based on the grade elevation of the railroad tracks at East Fifth avenue which has practically shut off means of access to the company's plant.

The Porter Rubber Co., Salem, Ohio, recently voted to sell \$110,000 of its treasury stocks. Funds realized will be devoted to an increase of capacity, the present output being 100 tires daily.

New Goods and Specialties.

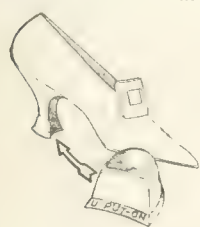
"LIBERTY" BATHING CAP.

THE rampant tri-colors are attractively in evidence on one of the new bathing caps, shown herewith. The full-shaped red rubber body of the cap is gathered into a close-fitting band of blue, frilled at the top with white and decorated with white stars at intervals of about two inches, and a red rosette in the center of the front. [The Seamless Rubber Co., Inc., New Haven, Connecticut.]



THE "U-PUT-ON" RUBBER HEEL.

The rubber heel has until lately been made almost exclusively for low-heeled shoes, and was more suited to men's, boys' and children's footwear, or for the athletic type of women's shoes.



The small French or Louis heels worn by fashionable women presented a problem to the rubber-heel maker, but this is happily solved by the "U-Put-On" heel, which, as its name indicates, can be attached by the wearer, it being a sort of socket or tip which slips over, and clings tightly to the heel of the shoe. It can be readily trans-

ferred from one heel to another and adjusted to wear evenly. An arrangement of vacuum cups in the central portion prevents slipping. These heels are supplied in four sizes, suited to the various types of French heels, and in black, gray, tan or white colors. [Robert E. Miller, Inc., 11 Broadway, New York City.]

RUBBER PROTECTOR FOR NURSING BOTTLE.

Nursing bottles are very subject to breakage, either by unavoidable accident or as the result of the infant's throwing the bottle from the carriage or crib. An ingenious device recently placed on the market is a cage-like frame of soft white rubber, designed to protect the bottle from injury. This rubber frame can be boiled and sterilized without being removed from the bottle and is therefore convenient and perfectly sanitary. [J. E. Cosgriff, 347 Fifth avenue, New York City.]



AN OFFICIALLY TESTED TIRE FILLER.

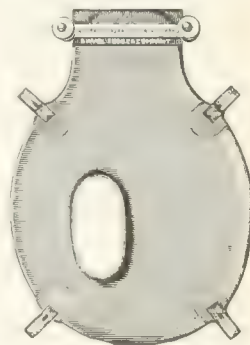
There are many fillers on the market, designed to seal punctures in tires. It is a comparatively simple matter to make a material, which, placed inside the tube, will stop punctures more or less effectively, and for a longer or shorter time. But to discover or invent a material which will not cause any deterioration to the tube is a somewhat greater problem.

That this has been accomplished is the claim for Crew Levick Tire Seal, a semi-liquid material which has been severely tested officially by the laboratory engineer of the Automobile Club of America, a report of a certified test showing that the material did all that was claimed for it under tests which included driving

nails and leaving them in, driving other nails and immediately pulling them out, cutting with a penknife and allowing to heal, cutting larger slits and patching and vulcanizing. Even under such treatment pressure tests showed almost no loss of pressure in three days' runs, totalling almost 300 miles. It is claimed by the makers that this material is not harmful to tubes, but rather is really a preservative, and that tubes containing this filler will last longer than those without it. [Crew Levick Co., Philadelphia, Pennsylvania.]

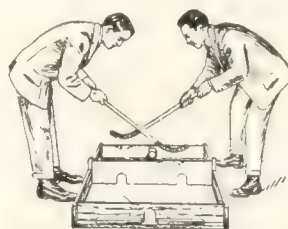
IMPROVED AURAL ICE BAG.

The aural ice bag of improved design shown here is pronounced very efficacious in cases of mastoiditis. By means of an opening through the bag which allows it to fit under and around the ear, application is made directly at the point desired to be reached. Pure gum, in the natural gray color, is used in the manufacture of this aural ice bag, and a new patented clamp, of the snap-lock variety, is supplied with it. The mouth of the bag is closed by inserting between the folds of a metal plate and held in place by a metal frame, a simple pulling motion clamping it firmly together. [Davol Rubber Co., Providence, Rhode Island.]



GAME WITH RUBBER BALL.

In the game called "Shinny in the Box," here illustrated, a solid rubber ball $2\frac{1}{2}$ inches in diameter is used. This game is adapted to players of all ages and is said to afford opportunity



for the exercise of skill and endurance, as well as being highly amusing to the onlookers. It can be played by two persons or by teams of two or more on a side. The opposite side of the box is marked out so that rubber quoits may be played, and the complete set consists of box, sticks, rubber balls, quoits and stand. [Wright & Ditson, 344 Washington street, Boston, Massachusetts.]

SHOULDER PAD WITH RUBBER TUBING.

Playing football may not be as perilous as assaulting enemy trenches, yet there are many chances for serious injury. The

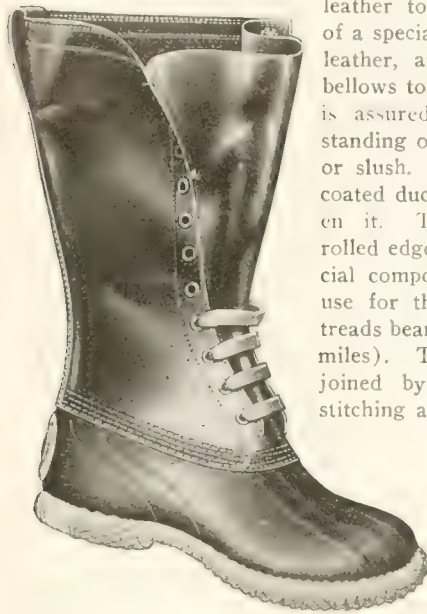


football player of to-day has a costume conspicuous for shielding him from such injuries and a new shoulder pad is shown here which has for its effectiveness an air-filled ring of rubber

tubing held in place over the point of the shoulder bone by a lining of leather secured all around both sides of the tubing and padded in the middle. Another rubber tube goes under the arms, and this and the laced collar hold the pad in position. It is claimed that even the severest blows on the shoulders, thus protected, are hardly noticeable. The same idea, a round rubber pneumatic ring, is used in a knee pad with equally good results. [Sell Sporting Goods Co., Canton, Ohio.]

A WHITE-SOLED PAC.

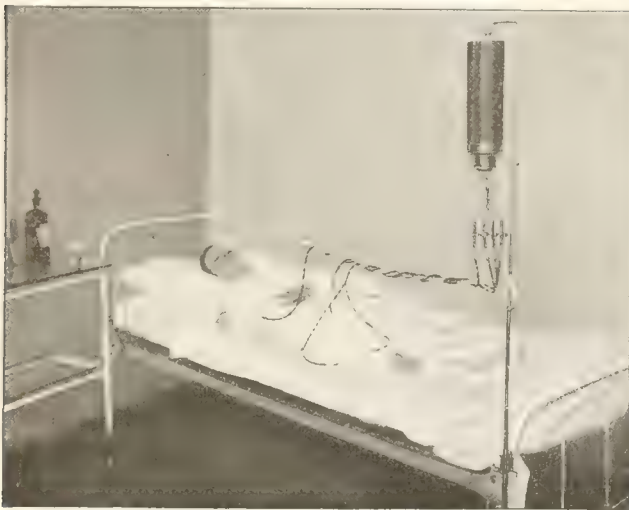
A boot calculated to stand the hardest wear, and give comfort and long service to the outdoor worker is here illustrated. It is



a combination of rubber foot and leather top. The latter is made of a specially prepared waterproof leather, and is provided with a bellows tongue, so that the wearer is assured dry feet, even when standing or walking in deep snow or slush. The upper is of heavy coated duck with ribs to strengthen it. The white sole has a rolled edge, and is made of a special compound which the makers use for their tire treads; (these treads bearing a guarantee of 5,000 miles). The top and upper are joined by four rows of heavy stitching and a loop is formed by a continuation of the backstay. This is an excellent boot for heavy outdoor work in winter. [Converse Rubber Shoe Co., Malden Mass.]

MULFORD APPARATUS FOR APPLYING CARREL-DAKIN SOLUTION.

An apparatus for applying the Carrel-Dakin solution, widely known through its use in the war for irrigating wounds, has lately been perfected by the firm of manufacturing and biological chemists which also makes the solution itself.

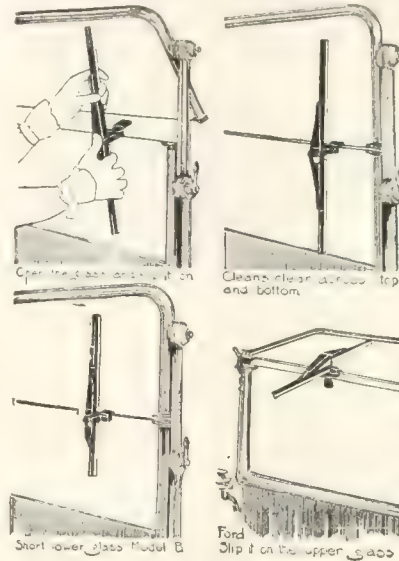


A series of individual connecting tubes makes possible the treatment of several wounds at one time from the same reservoir, the special thick-walled rubber tubing with very fine bore permitting only a minimum loss in temperature of the solution as it passes through these connecting tubes. Absolute control of the amount of solution flowing to each individual instillation

tube is maintained by observing through the individual sight drips and regulating by means of metal clamps. The collapsible stand furnished with the outfit has adjustable collars attachable to any size bed post. This apparatus can also be adapted for the "Murphy drip" and for hypodermoclysis. [H. K. Mulford Co., Philadelphia, Pennsylvania.]

THE TRI-CO UNIVERSAL RAIN RUBBER.

Many of the devices for cleaning the windshield of a motor car in a storm are stationary, forming an unsightly attachment in clear weather when their use is not demanded. This simple

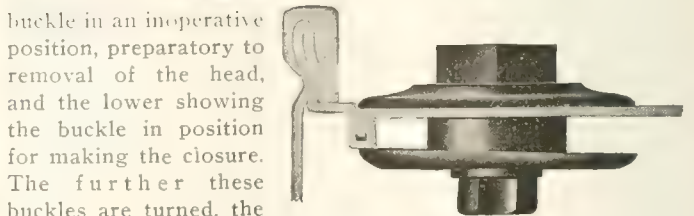


little device is designed to be quickly and easily attached and detached from a two-piece shield. It consists primarily of a traveling section which is mounted in and slides along the opening between the upper and lower halves of the windshield, holding on to the edge of the glass by a channel. Two arms project from this section, one to each panel of the shield, and on each arm are two rubber strips set edgewise, so that when moved across the glass sur-

face, water is pressed off by the close fit of rubber to the glass. To prevent possible scratching of the glass, the rivets holding the various parts together are topped with celluloid where there is any chance of contact. This windshield cleaner is made in five models, to fit practically any type of two-piece windshield. [Tri-Continental Corporation, Sidway Building, Buffalo, New York.]

METAL BARREL WITH RUBBER GASKET.

A new type of metal barrel has a 6-inch opening and, also, a special removable head which can be made absolutely liquid-tight by the action of a series of buckles, or bolts, compressing a rubber gasket 3/16-inch round, vulcanized to form a complete circle, hollow at the center. The illustrations are sectional views of the barrel, the upper one showing the



buckle in an inoperative position, preparatory to removal of the head, and the lower showing the buckle in position for making the closure. The further these buckles are turned, the tighter they squeeze the rubber gasket, thus effectively sealing the barrel. The removable head allows this barrel to be used economically for the shipment of powders such as red or white lead, or heavy oils, paints, varnishes and greasy substances difficult to clean out of the ordinary barrel. [Detroit Range Boiler Co., 607-623 Twenty-fourth street, Detroit, Michigan.]

The Editor's Book Table.

THE COTTON YEAR BOOK AND DIARY, 1917, BY S. ECROYD. Marsden & Co., Limited, Manchester, England. [868 pages, 4 by 6 inches, leather-bound. Price, 2s. 6d., net.]

THIS annual, of which the present volume is the twelfth issue, contains in compact compass a vast amount of information regarding the cotton industry in England. A review of the cotton trade for 1916, the exports and imports, the yields of cotton crops all over the world, the profits and losses of English cotton mills, patents, and much statistical information, properly tabulated. A large part of the book is given over to information regarding processes and machinery, every detail of manufacture being explained, with simple illustrations and diagrams. A diary is added, with suggestions as to the week's work in maintaining mill and office efficiency. The book is one which will be found valuable for reference by all manufacturers of cotton fabrics.

THE EFFECT OF WARS AND REVOLUTIONS ON GOVERNMENT Securities, External and Internal. By E. Kerr, Librarian, William Morris Dublin & Co., Bankers, New York City. [8vo, boards, 131 pages.]

This handsome book for distribution to investors recalls the principal historical events of ten leading modern nations during the last century and presents much information about government indebtedness, wealth, bond issues and their prices in tabular form covering periods of 50 to 100 years. These compilations are unique and add much to the interest and value of the book as a work of reference.

It is pointed out that although wars and revolutions may retard civilization temporarily, they have the immediate effect of stimulating human thought and endeavor, resulting in a period of expansion and invention in the defeated as well as the victorious country.

HOW TO BUILD UP FURNACE EFFICIENCY. A HANDBOOK OF Fuel Economy. By Jos. W. Hays, Chicago, Illinois (16 mo., paper, 154 pages. Price \$1, postpaid.)

With fuel costs abnormally high, this book of practical information by a combustion engineer should find favor with every firm having a steam power plant. Written in a breezy vein, the work will prove entertaining as well as informative, and indicates that all scientific treatises need not be as dry as dust from a literary standpoint. In the words of the author, the book consists of five reels, including a few snorts about industrial efficiency and other things, together with an appendix devoted to oils, gas, wood refuse and other fuels. The five reels tell pointedly and in graphic fashion why and how fuel is wasted, how to spot and stop these wastes, and how to keep them stopped.

STATISTICS OF MANUFACTURES, COMMONWEALTH OF MASSACHUSETTS. Thirtieth Annual Report. Bureau of Statistics, Boston, Massachusetts. [Paper, 8vo, 130 pages.]

With boots and shoes the principal industry of the state, it is not surprising that footwear should lead the rubber industry; and according to this latest source of official information rubber footwear was manufactured to the value of \$27,414,901 by an average of 9,274 wage earners in 8 establishments, representing an invested capital of \$23,184,118. Woven belting and hose to the value of \$1,060,686 were produced by an average of 195 operatives in 6 establishments, representing an invested capital of \$1,172,515. Miscellaneous rubber goods amounted to \$25,805,175, and were the product of an average of 5,078 wage earners in 36 factories, representing an invested capital of \$20,106,498. Each classification showed a big increase over the preceding year, the largest, that of footwear, being \$3,626,113.

THE LAW OF PATENTS FOR DESIGNS. BY WILLIAM L. Symons, LL.M. John Byrne & Co., Washington, D. C. [8vo, 134 pages, buckram binding. Price, \$3.]

This important work treats in a simple and concise manner the practice which obtains in the prosecution of applications for design patents in the United States Patent Office as shown by the rules and decisions. Its six chapters are devoted to Design Patent Statutes; Subject Matter for Design Patent; Invention; Novelty and Infringement; Applications and Letters Patent; Procedure in the Patent Office. Design patents are of great interest to lawyers, manufacturers and others dealing with industrial development, and this is the only text book on the subject published since 1889. The history of the design patent law; its development, and the present law are fully discussed. The author is a member of the bar of the District of Columbia, a lecturer at the Washington College of Law, and an examiner at the United States Patent Office. It is not surprising, therefore, that his book has been cited as an authority in briefs filed in the Supreme Court of the United States as well as in many federal courts, and that it has been quoted in decisions rendered by the Patent Office. Since its publication in 1914, two supplements have been issued reviewing all decisions and Patent Office rules published on this subject up to October 1, 1916.

PENANG CHAMBER OF COMMERCE. REPORT FOR THE YEAR 1916. [Cardboard cover, 122 pages, tables.]

In spite of shipping difficulties, those countries in a position to supply material needed in the great European conflict are prospering in no inconsiderable measure and Penang, a tin and rubber exporting center, is no exception. The volume of trade during the year 1916 shows a marked increase over that for 1915; money is plentiful, bankruptcies few and generally unimportant. The new Bangkok-Penang-Kuala Lumpur line by which railroad communication is established between Siam and the Malay Peninsula—also plans for developing the part of Prai—are further indications of a growth which owes not a little to the impetus of the war. The question of alienation of land to foreigners naturally finds a place in the report, and it is gratifying to note that although the vast majority of producers in Malaya are badly infected by the American scare, there are a few—but a very few, let it be said—who have remained immune and are able to look at the matter with impartiality.

STATISTICAL ABSTRACT OF THE UNITED STATES, 1916. Thirty-ninth Number. Department of Commerce. Government Printing Office, Washington, D. C. [Paper, 8vo, 773 pages. Price, 50 cents.]

This annual publication of the Bureau of Foreign and Domestic Commerce contains the official statistics of the United States relating to area, natural resources, population, etc.; education, agriculture, forestry and fisheries; manufactures and mines; occupations, labor and wages; internal communication and transportation; merchant marine and shipping; foreign commerce; commerce of non-contiguous territory; consumption estimates; prices; money, banking and insurance; public finance and national wealth; army, navy, civil service, pensions, etc.; statistical record of the progress of the United States; commercial, financial and monetary statistics of the principal countries of the world.

According to the summary of manufactures for the census year 1914, 49 establishments manufacturing woven and rubber hose, representing a capital of \$27,285,000 and employing 7,394 persons, turned out a product valued at \$28,002,000. Rubber boots and shoes to the value of \$53,822,000 were manufactured by 23 establishments, representing a capital of \$46,051,000 and employing 20,359 persons. Miscellaneous rubber goods amounting to \$223,611,000 were the product of 301 establishments, representing a capital of \$199,183,000 and employing 62,257 persons.

A table of crude rubber imports from the time of the Civil War up to the present shows an almost constant gain from 2,125,561 pounds in 1862 to 267,775,557 in 1916, an increase of over 127 times. The table of average import prices of india rubber and gutta percha* crude per pound from 1892 to 1916 is also of interest. It gives the price in 1892 as 49.3 cents, and in 1916 as 57.9 cents, but shows the price of 42.9 cents in 1893 to be the lowest and of 105.8 cents in 1911 to be the highest during the period.

Exports of domestic manufactures of india rubber of all sorts have increased from \$6,543,735 in 1906 to \$35,153,374 in 1916. Exports of foreign unmanufactured india rubber, gutta percha and substitutes, however, have fallen off from \$5,063,065 in 1912 to \$2,929,405 in 1916, although exports of foreign manufactures of india rubber and gutta percha have increased from \$6,746 in 1912 to \$39,186 in 1916.

DE GOUVERNEMENTS. RUBBERONDERNEMING "SLOOTWIJK." Rapport van den Directeur van het Goudschoubedrijf bij het Boschwezen in Nederlandsch-Indië, met verzoek in Nederland, H. J. van Hasselt, met volge opdracht van Z. M. Excellentie den Minister van Koloniën bij besluit van 25 October 1915, Afd. A3 en B., No. 34. [Paper cover, 104 pages.]

"The government is the body least fit to cultivate a doubtful crop." With this drastic quotation the author commences the history, present condition and future prospects of the government's rubber plantation, "Slootwijk," in Surinam, and the statement is fully borne out by the story of failure that follows—failure due to ignorance of the most essential points in rubber cultivation, to grave mistakes in management and administration. A comparison of the estate as it is after past errors have been retrieved as far as possible, with government estates in the East, as well as investigation into the condition of other crops in Surinam, lead the author to conclude that *Hevea* planting in the latter country does not pay and should absolutely not be encouraged.

NEW TRADE PUBLICATIONS.

MUCH favorable comment has been elicited by the striking advertising design entitled "Fisk Tires at the Beginning," which appeared on billboards throughout the country during the month of June. The work of N. C. Wyeth, an American artist of international fame, this poster depicted stalwart negroes coming out of South American forests laden with huge baskets of crude rubber.

* * *

"Bowohoco News" is the name of a very readable four-page paper published monthly in the interests of the employes of the Boston Woven Hose & Rubber Co., Cambridge, Massachusetts. In addition to the personals of this thriving factory, inspiring statements regarding the progress of the business are made and much valuable information to all engaged in rubber manufacture is reported. The staff consists of William F. Wall, editor; John B. Kelley and Grant L. Wiswell, associate editors.

* * *

The Link-Belt Co., Chicago, Illinois, is sending out a strikingly effective booklet entitled "The Ideal Drive for Textile Machinery." The silent chain drive made by this concern is fully explained, and a large number of half-tones illustrate the use of these drives in textile mills. The cover and the borders of the pages so thoroughly imitate woolen goods as to surprise those who receive the booklet.

* * *

Advice is made up principally of don'ts and do's, and the don'ts predominate. The Goodyear Tire & Rubber Co., Akron, Ohio, has issued a set of bulletins for tire users. Each is a little leaflet, about envelope size, devoted to one particular phase of tire service. The list comprises "How to Increase Tire Mile-

*India rubber only after 1860.

age," "Proper Inflation Pays," "What to do for Tread Cuts," "Fabric Breaks," "How to Avoid Scraped Treads," "Premature Tread Wear," "How to Use Chains," "How to Make Inner Tubes Last Longer," "Rim Cutting," "Chafed Side-Walls" and "The Way to Maximum Mileage."

* * *

The Batavia Rubber Co., Batavia, New York, has issued a neat little advertising souvenir representing a wire wheel, to which is fitted a miniature tire of real rubber, bearing the ribbed tread used by this company. The whole affair is only a little more than two inches in diameter, and while it may not have been intended to be used as an eraser, it has proven efficacious in this particular.

FAULTLESS "WEAREVER" ADVERTISING ON BROADWAY.

The Faultless Rubber Co., Ashland, Ohio, manufacturer of "Wearever" rubber goods, has been chosen as representative

in the household rubber goods field of the high ideals for which the Rice Leaders of the World Association stands.

As an association member the Faultless company will flash its messages to the public every night on the mammoth electric sign erected on the roof of the Hermitage Hotel, New York City. This elaborate sign occupies one thousand square feet of space, and the display, illuminated with thousands of brilliantly colored electric lamps, makes a most beautiful picture which attracts the attention



of over 70,000 persons who pass through this great thoroughfare nightly—not only New Yorkers, but thousands of visitors to the great metropolis.

THOSE WISHING TO KEEP INTIMATELY POSTED ON ALL SUBJECTS pertaining to American preparedness and participation in the war will find the pages of "National Defense and the International Digest" intensely interesting. This attractive monthly magazine is published by the Writers' Press Association, 304 Madison avenue, New York City, at \$1 a year; foreign subscription, \$1.50. It contains many well-illustrated articles by prominent army and navy officers, eminent engineers and manufacturers, and leading publicists on timely topics of national and international importance.

A VIVID WORD PICTURE OF AKRON, OHIO, "THE RUBBER CITY," as it was, is and will probably become, detailing the phenomenal expansion of its titanic industries, depicting its present social and living conditions, and outlining the gigantic civic problem confronting its leading men, is entitled "Akron: Standing Room Only!" by Edward Mott Woolley, the leading article in "McClure's Magazine" for July. Seldom has fiction proved more fascinating than the authenticated facts there presented.

Interesting Letters from Our Readers.

MANUFACTURERS SOUGHT FOR WEBBED GLOVE.

TO THE EDITOR OF THE INDIA RUBBER WORLD:

DEAR SIR—Enclosed you will find photograph of the very first webbed glove that I made. The webs are solid piece with the rest of the glove. I made it on a plaster paris mold of my own design.



I would like to find someone to take up manufacturing on a large scale, as I already have large orders from the biggest dry goods houses in the country to bring them in to put on sale. Or I would make liberal arrangements to manufacturers on a royalty basis for the whole United States.

My patent is one of the best and my mold is registered also. I have the whole market of the world before me.

A. K. ZAWODZSKI.

2405 E. Allegheny avenue, Philadelphia, Pennsylvania, July 22, 1917.

RUBBER CARGOES AND THE SUBMARINE.

TO THE EDITOR OF THE INDIA RUBBER WORLD:

DEAR SIR—Brazilian rubber and other cargoes destined to the United States now enjoy the protection of an American squadron which arrived in Rio de Janeiro early in June to relieve the British and French patrol of the western hemisphere and was accorded a hearty welcome by the Brazilian Government, the Chamber of Deputies cabling a message of congratulations to the Congress of the United States. This act, together with the seizure of 46 interned German ships following revocation of neutrality by Brazil, seems to foreshadow her active co-operation with the United States in the war.

Already the American navy is making itself felt in the submarine zone where U-boat work is materially weakening. The arrival of our destroyer flotilla and of allied cruisers released from American waters has provided more ships, while progress in the prosecution of the anti-submarine campaign and more vigorous offensive measures have greatly reduced the list of sinkings for several weeks past. Naval experts believe the improvement is cumulative, and that another "black week" will not occur. Gun crews of merchant ships are also doing good service in beating off attacks, and have bagged one or more U-boats, while the steamship "Mongolia," which fired the first gun and made the first hit for America in the war, has again come into the limelight, having exchanged four shots with a German submarine that fired a torpedo at her on her last passage to London. Neither the liner nor the submarine was hit.

Shortage of ships and consequent high cargo rates have

materially increased the cost of production of rubber goods, but have by no means become the serious matter that they might. With the government shipbuilding program well under way, no serious interruption of the crude rubber supply seems likely, but should unrestricted submarine warfare really threaten the American rubber industry leading men in the business may well jointly turn to Simon Lake for relief. It was he who invented the submarine and he, if anybody, who can defeat it. The world no longer laughs at Simon Lake, for he has made good all his statements and all his prophecies have come true. His statement that the German submarine can be beaten at its own game of invisibility by submersible cargo boats appeals to every thinking man as a last resort that cannot fail, but Lake goes a step farther and points out certain advantages held by this type of ship in peace times, thus indicating that the construction of such vessels may properly be regarded as better than an emergency investment. The "Deutschland" proved that subsea commerce is absolutely practicable, but whereas she carried only about 500 tons of merchandise, the huge undersea cargo boats Lake stands ready to build according to his latest standardized plans are of 5,000, 7,500 and 10,000 tons dead weight carrying capacity, designed not for speed but for safety in operation and utilizing almost any kind of propelling power most readily obtainable. Germany is reported to have been planning a fleet of such submersible merchantmen when the United States entered the war and our ports were closed to German ships. Now the opportunity is ours or that of our allies. Narrowing the matter down to crude rubber imports, England could perhaps profit more by such ships than America, because at present most of our rubber reaches us direct from the Far East and absolutely unmolested. On the other hand, Germany figures that she can accomplish most by confining her attacks to the congested sea lanes of the English channel where the maximum of ships may be sunk with the minimum of effort and time. As a happy sequel to the death and destruction wrought by the war submarine it would be a satisfaction indeed to have this wonderful invention rehabilitated for constructive service in peaceful merchant shipping.

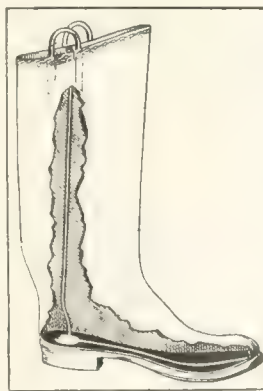
ONLOOKER.

Boston, June 28, 1917.

AIR SUPPLY DEVICE FOR RUBBER BOOTS.

TO THE EDITOR OF THE INDIA RUBBER WORLD:

DEAR SIR—I cannot see why rubber companies do not manufacture something in the way of a pneumatic insole to keep the feet dry when wearing rubber boots. I made a pair over 30 years ago and still have this first crude affair. The insole was provided with a flat rubber bulb at the heel. From the



back of this bulb a tube passed up beside the ankle to the top of the boot. From the front of the bulb there was a flexible tube within the insole to a point near the toe. The operation of the sole was this: As the weight was thrown on the heel (in the advance step), the heel acted as an automatic valve and closed the back tube, at the same time forcing fresh air out of the front tubing at the toe. As the perpendicular line of bearing was carried forward, and the weight came upon the ball of the foot, the front tubing was closed. The pressure on

the bulb then being released, it at once took a fresh supply of

air from the top of the boot, and so on alternately at every step, thereby keeping the feet sweet, clean and dry.

All who have worn rubber boots, especially in warm weather, know the torture they undergo and I would like to see such a thing put on the market at a reasonable price.

M. C. BARDEN.

West Pawlet, Vermont, June 4, 1917.

As far back as 1890 the Hannaford ventilated boot, manufactured in Boston, was on the market. It had an elastic middle sole with compressible air cells connected with a tube extending to the top of the leg. It was similar in action to Mr. Barden's device, though the pneumatic feature was an integral part of the boot. We understand Mr. Barden's idea is a separate insole which can be placed in any of the boots now manufactured. Some years ago the Commonwealth Shoe & Leather Co., of Boston, Massachusetts, bought out the "Resilia" shoe, which had a ribbed rubber inner-sole effecting the same purpose, the air intake being at the breast of the heel. Its manufacture was discontinued after it had been on the market a few years. Undoubtedly any effective method of ventilating rubber shoes must conduce to the comfort of the wearer.—THE EDITOR.

PFYFFER'S RESILIENT WHEEL WITH PNEUMATIC HUB.

TO THE EDITOR OF THE INDIA RUBBER WORLD:

DEAR SIR—Your good description of my resilient wheel in the June issue, page 523, leads me to supplement additional information regarding its operation, which is based upon a new and thus far not generally admitted principle.

As it was your book "Rubber Tires and All About Them," which, more than anything else, showed me the right trail, especially by way of what you said on page 30 about the way in which a pool of water "receives a solid body thrown into it," I should like first of all to thank you for this book and then to take the liberty of submitting the main principle upon which my invention is based, to your kind personal investigation.

The whole question is whether or not from a given pneumatic tire, with a given inflation pressure and a given load, or load-shock, there is a bigger depression obtainable when the tire is in contact with a convex-shaped rigid member encircling the tire, than when the tire is in direct contact with the flat road.

My convex-shaped member *D* takes, so to say, the place of the pebble on the road in relation to the pneumatic tire, or the place of the "solid body" of your book (page 30) thrown in a pool of water. Not being able to increase the pool of water, I practically reduced the size of the solid body by reducing the size of the bearing part of the member *D*.

All the many attempts made long ago to obtain a really puncture-proof pneumatically cushioned wheel by putting an inflated tire somewhere between rim and axle instead of between rim and road proved to be a failure because no satisfactory resilience was obtained. The fact was always overlooked that the position of the tire inside of the rim necessarily means an enormous increase of the bearing surface, the encircling rigid member always bearing upon one-half of the circumference of the tire (in length). Now by means of the convex shape of the encircling rim I reduce at will the width of the bearing surface, thereby counterbalancing the increase in length. The result, as proved by my working model, is a lively cushioning effect not hitherto obtained from a pneumatic tire placed inside of the rim.

Repeated tests with my working model have confirmed the following facts:

1. A considerably deeper depression is obtained in contact with the convex-shaped member than the depression obtainable in direct contact with the flat road.
2. All other factors being the same, the depression is increased in proportion to the reduction of the radius of the rigid member's convexity.
3. A stronger inflation is allowed when the tire is bearing upon the convex-shaped rim without the increased inflation

pressure, giving such hard riding as would result from the same inflation in direct contact with the flat road.

4. Given a certain depression of the axle, a much gentler bend of the tire is obtained in contact with the convex-shaped encircling rim than the bend obtained in contact with a flat body, and this is the case in the plane parallel to the wheel as well as in the plane rectangular to the wheel.

5. The road shocks operate in my resilient wheel in an entirely different way according to their nature; those which are strong and persistent enough to overcome the inertia of the whole rim-section of the wheel being transmitted to and absorbed by the internal pneumatic tire, while quicker or weaker shocks are absorbed by the rim parts (solid rubber or other material) in contact with the road, eventually spoiling them to a certain extent. Thus practically all shocks are prevented in one way or the other from reaching the axle.

These five facts are of far-reaching importance, opening up an entirely new field for the use of pneumatic tires in well protected and well supported position somewhere between rim and axle, be it in addition to the usual pneumatic tire in contact with the road, when softest resiliency is wanted (*twice* pneumatically cushioned ambulance cars) or in combination with solid tires or even bare steel rims in contact with the road for commercial and war vehicles, where unfailing reliance and low maintenance cost under rough conditions is required. Power losses such as Professor E. M. Lockwood referred to in THE INDIA RUBBER WORLD of May, 1917, page 447, as being due to "flexure at the contact with the road" and to "under-inflation," are reduced to the minimum.

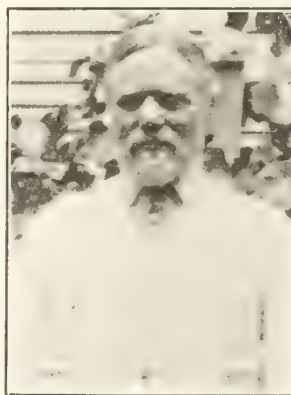
DR. P. DE PFYFFER.

New York City, June 5, 1917.

THE OBITUARY RECORD.

AN OLD-TIME RUBBER MAN.

HUGH A. NEWELL, for many years connected with prominent rubber companies in the capacity of superintendent, died at his home in Reading, Massachusetts, on July 10, aged 72 years.



HUGH A. NEWELL.

He was born in Belfast, Ireland, and came to America when about 22 years old. His first position was with the Revere Rubber Co., Chelsea, Massachusetts, in its coated fabric department, where he worked for three years, going from there to the Aetna Rubber Mills, which were owned by Clapp, Evans & Co., at Jamaica Plain, Massachusetts, where rubber boots, clothing and general molded goods were made. Here he advanced to foreman under the superintendence of Wheeler Cable. After 12 years with the Aetna company, in 1881, the Cable Rubber Co. was formed for the manufacture of high-grade rubber clothing and carriage cloth, and Mr. Newell became its superintendent. After nine years with this concern he went to the Reading Rubber Manufacturing Co., Reading, Massachusetts, filling the position of superintendent of that company for 22½ years. His next position was with the International Rubber Co., West Barrington, Rhode Island, then a small concern with a single calender, and which during his five years' connection grew to treble its former capacity. He retired from active business a few years ago and returned to Reading, where he had spent so many of his active years. At his death he was a member of the Baptist Church of that town.

Mr. Newell was well known in the trade as an able and efficient

official for the different concerns with which he was connected. He is survived by two sons, James, now with the Reading Rubber Manufacturing Co., and Harry K., who was formerly with the International Rubber Co., and two daughters, his wife having died seven years ago.

A RAINCOAT MANUFACTURER.

William O. Anderson, president of the L. M. Anderson Co., manufacturer of rainproof garments, Trenton, New Jersey, was drowned in the Delaware and Raritan Canal, which is near the factory of the company, July 7. It is thought that his mind became temporarily unbalanced, as he brooded over the automobile accident of a day or two previous, for which he might have considered himself responsible, and in which three persons were severely injured. The deceased was at the head of the above named company, and was active in its management. He was 60 years of age at the time of his death. He leaves a widow, and one son, A. J. Anderson, who is vice-president of the same manufacturing company.

A POPULAR SALESMAN AND EFFICIENT MANAGER.

John P. Stockton, president of The Globe-Gibraltar Rubber Co., Cleveland, Ohio, died July 19 at St. Luke's Hospital in that city, as the result of an automobile accident six days previous. Mr. Stockton was about 36 years of age, and was a very successful tire salesman. He had a large acquaintance in the trade and gained many friends wherever he traveled. It was through his genial disposition that he made a success of the Armstrong Rubber Co., which is now the Globe-Gibraltar company. He was a lineal descendant of Richard Stockton, a signer of the Declaration of Independence, and of Commodore Stockton, U. S. N. He leaves a widow and two children.

OFFICIAL OF AN AKRON ESTABLISHMENT.

A. L. Neiswanger, vice-president of the India Rubber Co., Akron, Ohio, was fatally injured in a street car collision in that city, July 3. He was born and reared in Orrville, Ohio, 40 years ago. He is survived by a widow, two brothers and a sister.

TRADE-MARK DECISIONS.

A. A. WATERMAN & CO., v. L. E. WATERMAN COMPANY. A history of the litigation regarding the use of the name "Waterman" by makers of fountain pens would fill several columns. The latest decisions include that in a suit in the New York Supreme Court, and in an appeal in the Appellate Division of the court. The former was instituted by Isaac E. and William L. Chipman, doing business as A. A. Waterman & Co., to restrict the L. E. Waterman Co. from interfering with their rights in the use of the words "A. A. Waterman & Company" and from bringing any suit for damages or injunction against any person by reason of the manufacture or sale by such person of any fountain pen bearing these words. The Court ruled in favor of the plaintiffs, provided, however that the words "Not connected with the L. E. Waterman Company" were added to the words "A. A. Waterman & Company." An appeal was taken by the L. E. Waterman Co. and the Appellate Division of the Court reversed the above ruling. [Trade-Mark Bulletin, May 1, 1917.]

EX PARTE, THE MILLER RUBBER CO. The goods sought to be covered by one registry include virtually everything made of rubber as, for example, vehicle tires, bathing caps, rubber heels, rubber tubing, barber's bibs, balloons and rubber sponges among others. Obviously these could not all be included in any existing class of goods; the applicant's virtual proposition is that a new class of goods could be formed to include everything made of rubber and it points out certain undoubted hardships

in having to make several registrations at heavy expense. The convenience of the applicant cannot be paramount to the convenience of the public. The applicant does not make rubber, but various articles of rubber. If the applicant wishes to use the same mark on tires and on bathing caps, it must make separate registration; there is no possible way to avoid it. [Trade-Mark Bulletin, June 1, 1917.]

STORK CO. VS. STERLING CO. The defendant company applied for registration for maternity frocks, a design representing two storks holding a banner bearing the words "La Mere." The plaintiff filed an opposition as owner of a trade-mark of the same description except with the name "Stork" in place of "La Mere," for waterproof fabrics and articles made therefrom. [Trade-Mark Bulletin, May 1, 1917.]

EX PARTE L. CANDEE & CO. The trade-mark "Unika" was refused registration on the ground that it is similar to the previously registered "Unico" trade-mark for boots and shoes. This latter trade-mark, however, was registered for leather boots and shoes, and the decision is that reference be withdrawn and trade-mark allowed. [Trade-Mark Bulletin, May 1, 1917.]

BOSTON RUBBER SHOE CO. V. ABRAMOWITZ. An interference proceeding where application was made to register the words "The Hub" with a picture of a hub between them for leather shoes. Another applied for registration of the word "Hub" as a trade-mark for shoes with canvas uppers and leather or rubber soles. The latter could show no proof of use except on tennis shoes with leather insoles and on rubber shoes. Hence the commissioner decided there could be no interference. [Trade-Mark Bulletin, May 1, 1917.]

EX PARTE, INDIA RUBBER, GUTTA PERCHA & TELEGRAPH WORKS, LIMITED. The trade-mark "Silver King" for golf balls was rejected because of prior registration of the trade-mark "King" for the same goods. The commissioner held there was no likelihood of confusion, as the word "Silver" is the most prominent part of the proposed trade-mark and it has a suggestiveness different from the word "King." [Trade-Mark Bulletin, June 1, 1917.]

THE GOODYEAR TIRE & RUBBER CO. V. THE FIRESTONE TIRE & RUBBER CO. The Firestone company filed on November 4, 1915, an application for registration of a trade-mark for rubber tires and casings for vehicles, originally said to consist in a black tread and red side walls, but later defined as a circumferential band of black intermediate between two circumferential bands of red, disclaiming the picture of the tire itself. The application was rejected on reference to registration No. 85,434 to the Goodyear company, dated February 20, 1912, of a central circumferential band or stripe of blue; but on argument that rejection was withdrawn. Upon allowance and publication an opposition was filed by the Goodyear company and sustained, from which ruling appeal is taken by the Firestone company.

Assistant Commissioner Clay in his argument sustaining the decision of the Examiner of Trade-Marks, concludes^{as} follows:

"Broadly considered, I think the applicant's mark fails to come within the proper definition of a trade-mark, and especially it is not a 'mark by which the goods of the owner of the mark may be distinguished' in the sense of the Trade-Mark Act." [Decisions of the Commissioner of Patents, May 22, 1917.]

CUSTOM HOUSE DECISION.

CRUDE CHICLE. The Board of General Appraisers sustained the protest of Schutte, Bunemann & Co., New York City, regarding the assessment of duty of 20 cents per pound as refined chicle. Claim was entered that it was crude chicle and dutiable at 15 cents per pound, in accordance with another provision of the same paragraph of the tariff act. On the authority of Abstract 39,077 the chicle in question was held dutiable at 15 cents per pound, under paragraph 36 of tariff act of 1913.

S. A. E. SUMMER MEETING.

THE SUMMER MEETING OF THE SOCIETY OF AUTOMOTIVE ENGINEERS, held June 25 and 26 at the Bureau of Standards, Washington, D. C., with headquarters at the New Willard Hotel, was an important one devoted almost exclusively to war needs. Monday was devoted to the standards committee, several divisions of which, including those devoted to aeronautics, electrical equipment, lighting and starting batteries, reported. Tuesday's program included the business and professional session, with reports of officers and miscellaneous business, discussion of the reports of the standards committee, and the reading of the following papers:

Building Submarine Chasers by Standardized Methods, by Henry R. Sutphen. (Illustrated by motion pictures.)

The Farm Tractor as Related to the Food Problem, by H. L. Horning. (Illustrated by motion pictures.)

Design and production of Aircraft in War Time, by Wing Commander I. W. Seddon, of the British Commission.

Classes and Uses of Battleplanes, by Lieut. Amaury de la Grange, of the French Commission.

Fundamentals of a Successful Kerosene-Burning Tractor Engine, by C. E. Sargent.

LESSONS OF THE WAR IN TRUCK DESIGN.

The paper "Lessons of the War in Truck Design," by W. O. Thomas, was particularly pertinent at this time and offered many valuable suggestions based on actual war experience, among which those relating to tires are of interest. He said:

All trucks sent from Canada were fitted with demountable tires on standard S. A. E. rims. This was decided upon before the British had adopted the American pressed-on type with a view to easy replacement in the field. Two makes were used in approximately even quantities. On both makes the locking rings and bolts and nuts were thoroughly vulcanized. Most of the tires were carefully shipped fitted with wooden center struts to prevent distortion of the rims. Ample spare tire parts of all kinds were supplied.

The subsequent use of these tires on the muddy roads in Flanders showed that they were much more difficult of replacement than the pressed-on type which is now standard on all British trucks. After the tires had been in use for some time in the mud they were removed only with the greatest difficulty, and once the rims had become rusted it was often impossible to remove them, even in a tire press. The most effective way was to take out the remnants of the rubber and to jar and expand the rims with a sledge hammer.

The tires of the pressed-on type, on the contrary, were easily applied and removed in a tire press, which was always to be found at every tire store. Tire presses also were fitted on railway cars, which were always available at railhead points with a stock of tires. As the main function of the motor trucks was to ship material and supplies from these same railhead points this method of replacement was a very simple matter.

Spare wheels with tires applied were always available at more advanced points, but these were necessary in any case to guard against the breakage of wheels and were easily used if there should be an emergency case of tire trouble in the field. Tires were almost universally pressed on with burlap strips. This was at first criticised, but it did not appear to cause any trouble, as with the general muddy condition it probably aided in the quick rusting on of the tire.

The standardization of the pressed-on type of tire on S. A. E. rims cannot be too strongly recommended. I am satisfied that the demountable type will be found wanting in war service in France.

ADVANTAGE OF SINGLE TIRES.

It is advisable to limit the number of sizes of tires to as few as possible. It is possible to use 5-inch for front wheels of all trucks, because the smaller trucks are naturally faster moving and the additional speed will easily make the wear even. In France a great many of the trucks are used with 5-inch dual tires on rear wheels. These developed serious troubles on account of the load often being concentrated on one of the tires only. On the granite block roads a projecting block on a damaged road would often cut out a large section of one of the tires. On heavily cambered roads the weights would concentrate on the inside tires. I am convinced that the wider-section single tires on rear wheels suffered less damage from these causes than the dual tires. I believe that tires with a slightly convex tread give

better service than absolutely flat-tread tires. Many of the tires sent from America to France appeared to be over-cured. In general they were harder and more liable to crumble than the European tires. On the other hand, many of more resilient tires gave trouble near the base and became detached from the steel ring.

TIRE AND RIM RECOMMENDATIONS APPROVED.

The carrying capacities and inflation pressures of pneumatic tires recommended by the Tire and Rim Division, as published on page 579 of our July issue, were approved by the Society.

THE JOURNAL OF THE S. A. E.

"The S. A. E. Bulletin," published for several years past, has been discontinued and replaced by "The Journal of the Society of Automotive Engineers," printed in the standard technical size, 9 by 12 inches, and is a credit to the organization.

MOTOR-CYCLE STANDARDIZATION UNDER WAY.

Another division was added to the standards committee of the S. A. E. when, at the request of the Ordnance Department, the members of the Motorcycle and Allied Trades Association joined the S. A. E. to carry its standardization work into the motor-cycle industry.

Motor-cycles for dispatch riders, transporting machine guns on side cars, and many other purposes are playing a conspicuous part in the war, and the need for standardization of detail dimensions of parts has constantly been becoming more obvious. A study is now in progress looking toward the formulation of a standard set of specifications to be used in the purchase of military motor-cycles. Typical machines are being examined and sub-committees have been appointed to report on the parts that can be standardized.

At a meeting of the temporary motor-cycle division of the standards committee on June 28 it was decided to standardize tires, rims, spokes, headlamp mountings and supports, chains, throttle control, clutch and brake pedals. Other items may be standardized at an early date. It was decided that both the front and rear wheels of the motor-cycle and the wheels of the side and rear car are to be alike and to carry the same rims and size and type of tire. Tire and rim specifications follow:

TIRES. All tires of military motor-cycles, side cars and rear cars are to be of the clincher type, 28 by 3 inches in dimension.

RIMS. All rims for military motor-cycles are to be made for 28 by 3 inch clincher tires and have the standard cc., with forty spoke holes, 17/64 inch in diameter, suitable for 1/4 inch spokes.

AMERICAN CHEMICAL SOCIETY.

THE program of the meeting of the American Chemical Society, to be held at Massachusetts Institute of Technology, Boston, Massachusetts, September 10 to 13, will include a general conference on "Chemistry in Warfare," opened by William H. Nichols, chairman Committee on Chemicals, Council of National Defense, and Marston J. Bogert, chairman Chemistry Committee National Research Council.

At the divisional meetings there will be conferences on "The Supply of Organic Chemicals for Research During the War" and "The Industrial Chemist in War Time."

The special committee appointed to lay definite recommendations before the Federal authorities that chemists be used for chemical service during the war, finds that the government has decided against any general class exemption. It is therefore recommended that chemists who may be drafted present facts of their education, experience and employment to local boards, with the request that they be allowed to continue at their present work, or in default of this, be detailed to serve as chemists in the military branch of the government.

The purpose of this recommendation is to put into the possession of the government authorities all the facts necessary for it to decide exactly for what service a given man is most fitted.

News of the American Rubber Trade.

FISK BUYS THE GIBNEY TIRE.

ON July 9 the United States District Court of Philadelphia, Pennsylvania, authorized the receiver, Henry C. Thompson, Jr., to consummate the offer of The Fisk Rubber Co., Chicopee Falls, Massachusetts, for the plant and all the assets of the Gibney Tire & Rubber Co., Conshohocken, Pennsylvania. The purchase price is about \$410,000, subject to such adjustments as may occur by reason of the closing of the books on July 9.

The Gibney solid tire has a reputation and trade name of considerable value, but the company lacked adequate capital in an enterprise requiring large amounts of money, and unwise purchases of crude rubber during a war-brought rubber trade flurry had further weakened its financial standing. In purchasing this property, the Fisk company assures the financial stability of the business and acquires a trade name and volume of production that will prove of distinct advantage in developing the sale of its own solid tires. Henceforth the Gibney tires will be manufactured on a much larger scale than in the past, a triple or even quadruple production being promised to consumers and the trade. The big Fisk solid tire unit at Chicopee Falls, Massachusetts, will also be put into operation as soon as possible. It is designed to have an output of 2,000 tires a day, making it one of the largest solid tire departments in the country.

Fortunately, the Gibney service stations in a number of cities, including New York City and Philadelphia, Pennsylvania, do not conflict with the Fisk branch system, and they will be retained practically intact, as will the Gibney organization, except that James G. and John Gibney have resigned. The increased output, however, will be marketed not only by the Gibney system, but by the more than 125 sales branches of the Fisk company, thus placing the latter in a stronger position as a distributor of solid tires.

CARLISLE WANTS A RUBBER FACTORY.

According to the Chamber of Commerce of Carlisle, Pennsylvania, a careful investigation by experts employed by that body results in a report that Carlisle is one of the best places in the country in which to locate a rubber factory, because of its location and railroad connections, its very dry atmosphere and its excellent water supply. Following this report, the Chamber of Commerce is endeavoring to induce some live, active rubber concern to locate there, and is ready to offer free factory site, low cost electric power, and financial assistance if necessary, to such a concern. Moreover, it is stated that there are many men living in Carlisle who are skilled in rubber working, having been employed at one time or another in rubber factories.

RUBBER COMPANY SHARE QUOTATIONS.

The following market quotations of shares of rubber manufacturing companies on July 25 are furnished by John Burnham & Co., 115 Broadway, New York City, and 41 South La Salle street, Chicago, Illinois.

	Bid.	Asked.
Ajax Rubber Co. (new).....	66½	7½
Firestone Tire & Rubber Co., common.....	118	21
Firestone Tire & Rubber Co., preferred.....	103	6
The F. F. Goodrich Co., common.....	49	50
The F. F. Goodrich Co., preferred.....	104	6½
Goodyear Tire & Rubber Co., common.....	197	201
Goodyear Tire & Rubber Co., preferred.....	105	7
Kelly-Springfield Tire Co., common.....	46	7½
Kelly-Springfield Tire Co., preferred.....	88	95
Miller Rubber Co., common.....	175	85
Miller Rubber Co., preferred.....	102	4
Portage Rubber Co.....	150	54
Swinehart Tire & Rubber Co.....	59	65
United States Rubber Co., common.....	60½	60½
United States Rubber Co., preferred.....	105	108

SOMERSET RUBBER RECLAIMING WORKS.

One of the busy spots in the rubber industry of New Jersey is the factory of the Somerset Rubber Reclaiming Works at New Brunswick, shown in the accompanying illustration. The plant is running day and night with orders enough for some time to come, many of them for special reclaimed stocks to go into government work for the rubberizing trade. The present capacity



SOMERSET RUBBER RECLAIMING WORKS PLANT

averages about one car of reclaimed rubber a day. New machinery is gradually being added, however, and new buildings are being erected. The laboratory is already one of the most complete of its kind, equipped with machinery of many sorts and supplemented by an analytical department.

Negotiations are in progress for the purchase of properties for the housing of employees, and a new lunch room is in course of construction near the factory to provide restful accommodations where the men can eat their own lunch while a Victrola is being played. Additional shower baths are being installed, which are much appreciated.

OPEN BRANCH OFFICES.

Stresen-Reuter & Hancock, Inc., dealers in colors and chemicals, Chicago, Illinois, have opened offices at 292 Pearl street, New York City, 418 New Market street, Philadelphia, Pennsylvania, and 82 Richmond street, East, Toronto, Canada. Stocks will be carried at these branches, as at the Cleveland, Ohio, branch of this concern.

RUBBER COMPANY DIVIDENDS.

The Boston Belting Co. paid a quarterly dividend of \$2 per share on July 2 to stockholders of record June 21.

The Eagle-Picher Lead Co. paid a quarterly dividend of 1½ per cent on preferred stock on July 16 to stockholders of record July 5.

The board of directors of the United States Rubber Co. has declared a quarterly dividend of 2 per cent on first preferred stock, payable July 31, to stockholders of record July 20.

The Kelly-Springfield Tire Co. has declared a quarterly dividend of \$1 per share on common stock, payable August 1 to stockholders of record July 16.

The Portage Rubber Co. has declared a quarterly dividend of 3 per cent on common stock, payable August 15 to stockholders of record August 5. This dividend raises the stock from a 10 to a 12 per cent basis.

UNITED STATES RUBBER CO. PROMOTIONS.

An announcement was sent out by the United States Rubber Co., New York City, stating that W. E. Barker had resigned as manager of sales of the footwear division in order to take up other important duties for the company. The following changes were also announced in the footwear division:

George H. Mayo is appointed manager of sales of this division of the company's activities. Charles W. Barnes becomes general selling agent, and R. F. Spencer is now manager of credits.

Mr. Barker has been connected with the rubber trade during his entire business life, starting with Charles M. Clapp & Co., Boston, Massachusetts, in 1882, and advancing steadily to the position of manager of sales. In 1889 he became selling agent for the Para Rubber Shoe Co., Boston. Three years later he organized the Enterprise Rubber Co., Boston, and for over 20 years was its president. When the office of merchandise manager of branch stores was created by the United States Rubber Co. in 1909 he was the first to fill that position. Four years later Mr. Barker was appointed to the office of manager of sales when that position was made vacant by the death of E. R. Rice. It is from this position that Mr. Barker has just resigned to take up other duties for the company. That he is fully equipped for any service to which he may be called is evidenced by this brief sketch of his experience in the rubber business.

George H. Mayo, who succeeds Mr. Barker as manager, though a younger man, can boast of nearly a quarter century in the

work to do, his immediately previous position being assistant to manager of sales, from which he has just been called to the office of general selling agent of the footwear division.

Richard F. Spencer's business life has always been associated with merchandising. Starting in a general store in 1867, he secured a position nine years later in the wholesale dry goods house of Crow, Hargadine & Co., St. Louis, Missouri. In 1881 he joined the force of Hamilton, Brown & Co., wholesale shoes and rubbers, St. Louis, and in 1888 was elected secretary and treasurer of the Hamilton-Brown Shoe Co., resigning from that position in 1910 to go with the United States Rubber Co. as comptroller, which office was a stepping stone to his new position.

NEW U. S. RUBBER COATED FABRIC FACTORY

The United States Rubber Co., New York City, has taken over the plant of the Milford Straw Hat Works, at Milford, Connecticut, for the manufacture of coated fabrics, and articles made therefrom. The company has been making a variety of these fabrics, some so closely resembling leather that they are being used extensively for automobile tops and upholstery work. The new factory is now being equipped with mills, spreaders, vulcanizers, etc., and also with machinery and appliances for the manufacture of traveling bags of this new fabric. It is contemplated that the company will also make here army blankets, ponchos and other equipment for the United States Government. The factory has a floor area of nearly 75,000



WILLIAM E. BARKER.

GEO. H. MAYO.

CHARLES W. BARNES.

RICHARD T. SPENCER.

OFFICIALS RECENTLY PROMOTED IN FOOTWEAR DIVISION, UNITED STATES RUBBER CO.

rubber footwear business. Starting at the age of 19 in the wholesale house of Wm. H. Mayo & Co., of which his father was the head, he became a junior partner five years later, just about the time when this firm discontinued its leather footwear business and devoted its entire attention to the sales of the imperfect and out-of-date goods of the United States Rubber Co. He succeeded Mr. Barker as merchandise manager of branch stores in 1913, and following closely, he now succeeds him as manager of sales. His steady, upward climb is the best proof of his fitness for his new position.

Charles W. Barnes has been connected with the United States Rubber Co. interests throughout his entire business life. On his graduation from the English High School of his native city, Boston, in 1885, he entered the employ of the American Rubber Co., then an independent company. When this company became a part of the United States Rubber Co., in 1893, he took an important position in the Boston office, giving special attention to the goods made at the American factory. Ten years later he was called to the New York office, where he has had special

square feet, and there is enough adjacent land to allow expansion. About 400 to 500 hands will be employed, the work to be under the supervision of the Goodyear's Metallic Rubber Shoe Co., Naugatuck, Connecticut. J. Wallace Harney, formerly with the L. Candee & Co., New Haven, Connecticut, is the local superintendent of the new factory.

GLOBE RUBBER TIRE MANUFACTURING CO.

J. B. Linerd, general sales manager of the Globe Rubber Tire Manufacturing Co., New York City, is planning an intensive national sales campaign for its hand-made tires. The plant at Trenton, New Jersey, was originally a part of the United & Globe Rubber Manufacturing Cos. of Trenton, New Jersey, but was purchased in its entirety by the Globe Rubber Tire Manufacturing Co., and since has been entirely independent of and has no connection whatever with the former company. Harry B. James was elected president, Henry L. Joyce, vice-president, and J. P. Hall, secretary and treasurer. The executive offices are at 1851 Broadway.

PACKING PLANTATION RUBBER.

RESPONDING to the activities of the Rubber Association of America, which placed the data and suggestions it had gathered regarding improved packing of plantation rubber at the disposal of the Rubber Growers' Association in London, the latter body has issued a circular to its members drawing particular attention to the following points:

THREE-PLY CASES. It is evident that three-ply cases are the most suitable for carrying rubber, provided they are assembled and closed strictly in accordance with the makers' instructions. Estate managers appear to think that the patent fasteners provided by the makers are not sufficiently strong and that nails must be driven in after the cases are closed in order to ensure safety of the contents. This is wrong and is responsible for serious complaints of bad-outturn, particularly when the rubber has to be opened up for inspection in London and/or New York before being sent on to the manufacturers.

MOMI CASES. Well-seasoned Momi cases, if properly hooped, appear to be satisfactory, but they do not stand transhipment well unless fully $\frac{5}{8}$ -inch thick after being planed ($\frac{3}{4}$ -inch before planing). The importance of using only cases which are sufficiently strong and well put together to ensure safe arrival of the contents does not appear to be sufficiently appreciated, and members are advised to pay whatever additional cost is necessary in order to secure packages that conform to requirements.

CHIPS AND SPLINTERS. All the manufacturers concur in complaining of chips and splinters getting into the rubber. Estate managers realize how important it is to clean the inside of the cases thoroughly before packing, but after the rubber is packed it apparently contracts until there is a certain amount of play inside the case, which results in splinters and particles of wood fraying off during transit and becoming embedded in the rubber. These are very difficult to remove.

It is essential that the rubber should be spread evenly quite close to the sides of the case, which should contain as much rubber as can be packed without undue pressure. A suggestion made by several American manufacturers is that the cases should be lined with cheesecloth or jackinette. The cost is about $\frac{1}{8}$ d. per pound of rubber. This expedition is now under trial.

MARKING. Cases should be clearly marked: "Stow Away from Boilers."

After having been advised by members of the American rubber trade if crude rubber arriving from British possessions shows any improvement in packing and condition on arrival as a result of these suggestions, the Rubber Association of America purposes to communicate again with the Rubber Growers' Association, outlining to them the opinions of American manufacturers and importers in regard to the efforts thus far made to improve methods of packing and shipment.

CRUDE RUBBER RATES ATTACKED.

The Goodyear Tire & Rubber Co., of Akron, Ohio, and others have filed a case with the Interstate Commerce Commission against the Akron, Canton and Youngstown Railroad and others, alleging that the defendants exact second-class rates on less-than-carload shipments of crude rubber from New York City, and the Commission is asked to prescribe for the future the third-class rate on less-than-carload shipments, and fourth-class rate, with a minimum of 36,000 pounds per car, on carload shipments. Similar allegations are made by the Kelly-Springfield Tire Co., Cumberland, Maryland, and the Batavia Rubber Co., Batavia, New York, additional points of destination mentioned being Wooster, Ohio; Buffalo, New York, and Cumberland, Maryland, and in another case the La Crosse Rubber Co., La Crosse, Wisconsin, attacks the classification ratings on crude rubber from New York City and other points in official classification territory to La Crosse. These cases have not yet been assigned for hearings.

PERSONAL MENTION.

Paul Luce, Buffalo, New York, salesman for the Boston Woven Hose & Rubber Co., Cambridge, Massachusetts, and Miss Jennie Campbell, formerly in the office department of the same company, were married July 16 and will reside in Buffalo. Before entering the sales department some years ago, Mr. Luce was foreman of the rubber belt department at the Cambridge factory.

Ralph Starr Butler, professor of advertising and marketing at New York University, has been appointed to the development department of the United States Rubber Co., New York City, to gather and collate data on market conditions. This work was formerly handled by Ralph Nystrom, now with the Hearst forces.

Charles F. Pichon, salesman in the Detroit branch of the United States Rubber Co., has been elected Grand Counselor of the United Commercial Travelers of Indiana. He is the youngest man who has ever gone through the different offices of the Grand Lodge of that state. He has been a traveling salesman for 15 years.

T. W. McNeil, of the Dayton Rubber Manufacturing Co., Dayton, Ohio, has been selected as one of the 12 members of the board of governors for the new Community Country Club.

F. H. D. Kop, manager of the David Birnie Co., rubber, tobacco and coffee exporters of Java, has been visiting this country for the purpose of interesting rubber manufacturers in his product. Mr. Kop states that Java's present output of rubber is 320,000 tons a year. He also says that rubber formerly exported to Rotterdam and London will hereafter be shipped to America through San Francisco.

Arthur W. Stedman, manager of Hagemeyer Trading Co.'s crude rubber department, recently suffered a painful and what might have been a serious injury to his leg while playing golf. His many friends in the trade will be glad to know that he is on the road to recovery and attending to business as usual.

L. A. Duffy, of the Hagemeyer Trading Co., 17 Battery Place, New York City, crude rubber dealer, returned last month from a successful business trip that included Para, Manaos and Ceara.

Robert Allan, manager of the Para branch of the London & Brazilian Bank and well known in the Amazon rubber trade, arrived in New York City last month.

George L. Haenn, of Baltimore, Maryland, has been appointed to represent J. Early Wood, Inc., manufacturer and exporter of chemicals, in that vicinity.

Ralph Croft, crude rubber broker, New York City, has removed his offices from 12 Bridge street to 72 Trinity Place.

Clarence B. Clark, chemist of the Somerset Rubber Reclaiming Works, New Brunswick, New Jersey, was in attendance at the convention of the American Society for Testing Materials held in Atlantic City, New Jersey, during the last week of June at the Hotel Traymore.

Edward Hutchins, for the past six years supervising engineer for the Federal Rubber Manufacturing Co., Milwaukee, Wisconsin, has opened engineering offices in that city at 866 Superior street. He will specialize in the design and construction of rubber manufacturing and power plants, furnishing complete plans and specifications for the buildings and equipment, including machinery layouts for the most economical and systematic handling of the raw materials and the finished products. In experience, Mr. Hutchins is amply qualified, having been connected with Westinghouse, Church, Kerr & Co., engineers, New York City, for 13 years in the construction of various types of manufacturing and power plants and; later, construction engineer in charge of rebuilding the G. & J. Tire Co.'s plant at Indianapolis, Indiana.

TRADE NEWS NOTES.

W. H. Salisbury & Co., Inc., Chicago, Illinois, the oldest leather belting and general mechanical rubber goods house in the Middle West, has moved to more spacious quarters at 308-310 West Madison street.

The Hope Webbing Co. was recently incorporated in Massachusetts to take over the business of the Rhode Island corporation of the same name, having an extensive plant at Pawtucket, Rhode Island, where are manufactured tire tapes, elastic webbing, trunk straps, belting and narrow fabrics. The officers are Joseph B. McIntyre, president; Charles O. Horton, vice-president and general manager; Charles C. Marshall, treasurer; Attmore A. Tucker, secretary. Hayden, Stone & Co., New York City, is handling the 7 per cent cumulative preferred stock of the company.

A three-story brick building, 40 by 85 feet, is being erected by the H. O. Canfield Co., Bridgeport, Connecticut, manufacturer of mechanical rubber goods, to take care of its natural increase in business.

The L. A. Dreyfus Co., manufacturer of rubber specialties, Rosebank, Staten Island, New York, has increased its capital stock from \$100,000 to \$1,000,000.

The Massillon Rubber Co., Massillon, Ohio has increased its capital stock from \$25,000 to \$60,000 and is erecting a two-story brick building, 50 by 50 feet, to care for increased business in surgeon's gloves, druggists' sundries and toy balloons.

The Federal Rubber Co., Cudahy, Wisconsin, is completing a 300-foot ell on a recently erected six-story building in its plant, this addition increasing the capacity of the mechanical goods department about 40 per cent and that of the tire department about 30 per cent. New equipment has been ordered.

The Gillette Rubber Co., Eau Claire, Wisconsin, is installing a 1,000-horsepower boiler plant consisting of the most modern type of water-tube boilers and stokers, including a 175-foot brick stack and a coal-handling apparatus. Edward Hutchins is the construction engineer.

The natatorium at Kitchener, Ontario, built and furnished by President Reider of the Canadian Consolidated Rubber Co., Limited, was officially opened Saturday, July 21. Expert swimmers and divers gave exhibitions during the day and evening.

The Buffalo Foundry & Machine Co., manufacturer of rubber machinery, Buffalo, New York, will build a new pattern shop on Fillmore avenue.

The Warren Rubber Co., Warren, Ohio, has increased its capital stock from \$80,000 to \$100,000, in order to finance a steadily increasing business.

The National Surety Co. recently executed a schedule bond for the United States Rubber Co. for \$5,613,000, which guarantees the honesty of approximately 2,700 of the company's employees both in this country and abroad.

The C. H. Gray Rubber Co., Dallas, Texas, selling agent for Hood tires, has moved its retail store into larger quarters in the Masonic building at Main and Pearl streets, where a thoroughly up-to-date service station is maintained with ten emergency cars at the call of customers day and night. This service and tire changes are absolutely free. The wholesale store of this company is located at 1926 Main street.

The La Crosse Rubber Mills Co., of La Crosse, Wisconsin, recently made a record shipment, 995 cases of rubber shoes weighing 26,000 pounds.

The Gustin-Bacon Manufacturing Co., Kansas City, Missouri, has just completed a fine service station, at a cost of \$50,000, at McGee Road and 27th street, about half way between the residential district and the shopping section. Around this is an L-shaped open garage, which has been most advantageous for the tire service business, better than the old method of having car owners stop along the curbing. The company also maintains a road service, consisting of 11 Ford cars, each of which

carries a stock of tires in assorted sizes, tubes, patches, etc.

An increase of 59 per cent in sales and 61 per cent in earnings for the six months ended June 30, as compared with the corresponding period of 1916, is shown by the Ajax Rubber Co., Inc., New York City. Net earnings were \$1,257,461.

The business of the Indiana Rubber & Insulated Wire Co., Jonesboro, Indiana, has so expanded as to make a radical increase in floor space necessary. This company has always been one of the uniformly successful concerns of the industry.

CAPTAIN APPLETON, SECOND.

FRANCIS H. APPLETON, JR., son of Captain Francis H. Appleton of Boston, is himself a captain, having received his commission from Governor McCall. His command consists of



CAPTAIN FRANCIS H. APPLETON, JR.

71 men all mustered in a part of the 67th of the Massachusetts State Guards. Young Captain Appleton has had considerable military training. He is a member of the Ancient and Honorable Artillery Co. of Boston, acting as Flanker for the commander. In the rubber trade his activities are well known in connection with various committees of the Rubber Association. He is also factory manager and treasurer for F. H. Appleton & Son, reclaimers, Boston and Franklin, Massachusetts. Of the same company William S. Goodwin, first lieutenant, Fred L. Tufts, corporal and three privates are also members of the Appleton force at the Franklin factory, and Lloyd E. Appleton, the secretary of the corporation, is a member of the Home Defense company at Rye, New York.

HAWKEYE COMPANY EXPANDS.

The Hawkeye Tire & Rubber Co., Des Moines, Iowa, has added two Southwark heaters to its equipment, which will enable the company to increase its output to 600 tires a day, its previous quota being about 187 tires and 215 tubes.

It was the intention of this company to do only a local business and supply the various stockholder-dealers throughout the State of Iowa. However, it has been decided by the board of directors to increase the output and enter other territory for the distribution of its tires. Its first outside connection is with the Kiskey Auto Supply Co., of Los Angeles, California.

PROBABLE MERGER OF REPUBLIC AND KNIGHT TIRE INTERESTS.

The controlling interest in the Knight Tire & Rubber Co., Canton, Ohio, has been acquired for the Republic Rubber Co., Youngstown, Ohio. It is understood that the "Knight" and "Blackstone" tires will be continued, and that a portion of the factory, after enlargement, will be devoted to the construction of Republic tires. Probably a new corporation will be formed, with a capital stock of \$20,000,000, to acquire both plants, and make extensive additions and improvements.

NEW INCORPORATIONS.

Allied Rubber & Mica Co., The, January 13 (Ohio), \$25,000. F. E. Driffeld (president and manager); Charles A. Driffeld (vice-president and treasurer); Charles Olds and Mrs. F. E. Driffeld, both directors. Warerooms, store and offices are located at 1430 West Third street, Cleveland, Ohio. To job mechanical rubber goods and electrical insulation, in the states of Ohio, Michigan, New York, West Virginia and Pennsylvania.

Ambrose Braid Co., Inc., July 14 (New York), \$1,000. Henrietta Johnson, 300 E. Fifth street; Joseph Buhl, 1351 Gates avenue, and Chris Dalury, 801 Broadway—all in Brooklyn, New York. To manufacture elastic webs, etc.

Berkshire Rubber Co. of New York, Inc., The, July 9 (New York) \$10,000. Albert Wurts, Pittsfield, Massachusetts, Burkhardt Wurts, 260 Central avenue, and Thomas D. McMurray, 292 Central avenue—both in Albany, New York. To manufacture rubber goods, etc.

Continental Plantation Co., July 16 (Delaware), \$1,000,000. M. L. Gatchell, L. A. Irwin, Harry W. Davis—all of Wilmington, Delaware. Principal office in the State of Delaware is with the Registrar and Transfer Co., 900 Market street, Wilmington, Delaware. To explore for, manufacture and deal in gum, caoutchouc, gutta percha, etc.

Cooper Garage & Vulcanizing Works., Inc., June 26 (New York), \$10,000. A. Stuart Cooper and Florence Cooper—both 95 Spaulding avenue, and Alfred Scrimshaw, 127 Spaulding avenue—all in Buffalo, New York.

Davenport Vulcanizer Manufacturing Co., April 2, (Iowa), \$25,000. Thomas J. Gillaspay and A. D. Brownlie—both of Davenport, Iowa. Principal office, Davenport, Iowa. This company is the patentee and manufacturer of the Davenport Vulcanizer and its supplies, and also manufactures chemically treated strawboard for all makes of vulcanizers; rubber cement; raw rubber patches and semi-cured patches; always-tite cloth; back fool-proof patches; the Gillaspay Sure Shot Manifold Heater and its supplies and the Davenport Vulcanizer Kit.

Delion Tire & Rubber Co., June 9 (Delaware), \$3,500,000. John F. Neary, Herbert E. Latter, and Herbert H. Ward, Jr.—all in Wilmington, Delaware. Principal office in the State of Delaware is with the Corporation Trust Co. of America, Du Pont Building, Wilmington, Delaware. To contract for, purchase and deal in all kinds of rubber, automobiles, automobile parts, etc.

Demas Armor-Cased Tire Saving Co., July 2 (Delaware), \$200,000. George H. B. Martin, Philadelphia, Pennsylvania; J. Vernon Pimm and S. C. Seymour—both of Camden, New Jersey. Principal office is with the Corporation Guarantee & Trust Co., Ford Building, Wilmington, Delaware. To manufacture and deal in tires, tire casings and shoes for use on automobiles operated by power.

Dittenhoefer Tube & Rubber Co., July 16 (Delaware), \$1,000,000. Arthur W. Britton, Samuel B. Howard and John A. Moore—all of 65 Cedar street, New York City. Principal office in the State of Delaware is with the United States Corporation Co., 311 S. State street, Wilmington, Delaware. To manufacture and deal in motors, motor parts, tires and tubes of every kind and description.

Double Mileage Tire Co., The, June 19 (Texas), \$5,000. J. N. Bolton, H. H. Rankin and P. H. Spiller—all of Houston, Texas. Principal office, Houston, Texas. To purchase and sell goods necessary in conducting an automobile selling business.

Endurance Tire Sales Co., Inc., June 23 (New York), \$10,000. John Burlinson, 700 W. One Hundred and Seventy-ninth street; Philip R. Straus, 286 W. Seventieth street, and J. Stuart Elkin—all in Englewood, New Jersey. To deal in tires.

Erie Tire & Rubber Co., June 25 (Delaware), \$10,000,000. A. W. Posey, E. G. Adams, H. Bonsall—all of Wilmington, Delaware. Principal office in the State of Delaware is with the American Guaranty and Trust Co., 206 W. Ninth street, Wil-

mington, Delaware. To manufacture and deal in automobile tires and all kinds of rubber goods.

Ganter Tire & Rubber Co., Inc., The, July 9 (New York), \$2,000. William J. Breslin, 850 W. One Hundred and Seventy-ninth street, New York City; Edward J. Ganter and William V. Kiefer—both 251 S. Broadway, Yonkers, New York.

Goodyear Waterproof Co., The, June 22 (New York), \$5,000. Barney Kimmel and Abraham Newman—both of 821 Broadway, and Alexander Weidman, 134 Eldridge street—all in New York City. Rubber apparel, etc.

Gregrea Manufacturing Co., Inc., June 26 (New York), \$100,000. Andrew F. Rea, Toronto, Canada; F. Hammett Gregory, 320 Broadway, and Walter A. Van Ness, 220 Broadway—both in New York City. To manufacture rubber and rubber-like products.

Harvey Tire & Rubber Co., June 30 (Maine), \$1,000,000. The directors are: George S. Soule (president), A. B. Farnham (treasurer), P. B. Drew and T. L. Croteau—all of Portland, Maine. To engage in the manufacture of tires and rubber goods.

International Life Suit Corporation, June 30 (New York), \$3,000,000. Oscar A. Youngren, 11 Broadway; Louis F. Bruen, 330 West End avenue—both in New York City, and James A. Watt, 229 Elm street, Richmond Hill, Long Island. Principal office, New York City. To manufacture rubber life suits.

International Resilient Tire Co., June 18 (Delaware), \$500,000. F. R. Hansell, Philadelphia, Pennsylvania; J. Vernon Pimm and S. C. Seymour—both of Camden, New Jersey. Principal office in the State of Delaware is with the Corporation Guarantee and Trust Co., 927 Market street, Wilmington, Delaware. To manufacture and deal in all kinds of tires, pneumatic airless, wheels and rims for automobiles, etc.

National Rubber Sales Co., July 5 (Indiana), \$25,000. Elmer S. White, David R. Ulmer, Ethel M. White and Blanche A. Ulmer—all of Terre Haute, Indiana. Principal office, Terre Haute, Indiana. To buy, cover, recover and repair automobile, motor-cycle and bicycle tires and to buy and sell auto accessories.

National Synthetic Rubber & Tire Co., July 17 (Delaware), \$1,000,000. Arthur W. Britton, Samuel B. Howard and John A. Moore—all of 65 Cedar street, New York City. Principal office in the State of Delaware is with the United States Corporation Co., Dover, Delaware. To manufacture and deal in all kinds of motors, engines, machines, etc.

Nebraska Tire & Rubber Co. of Omaha, The, July 2 (Nebraska), \$500,000. E. G. Wolfe, G. C. Peironet, C. E. Niswonger, William A. Graham, Irving F. Baxter and G. W. Toman. To manufacture and sell automobile tires, tubes, casings and accessories.

Old Hickory Tire Co., June 26 (Delaware), \$500,000. Charles H. Jones, W. I. N. Lofland, George W. Morgan—all of Dover, Delaware. Principal office in the State of Delaware is with the Capital Trust Co. of Delaware, Dover, Delaware. To manufacture tires, etc.

Pittsburgh Rubber Tire Manufacturing Co., July 9 (Delaware), \$1,000,000. Wilber A. McCoy, Pittsburgh, Pennsylvania; Charles H. Jones, and W. I. N. Lofland—both of Dover, Delaware. Principal office in the State of Delaware is with the Capital Trust Co. of Delaware, Dover, Delaware. To manufacture, buy, sell and deal in automobile tires for automobiles, motor trucks and motor vehicles of any kind and description.

Seneca Rubber Co., Inc., July 18 (New York), \$50,000. Herbert T. Auerbach, 854 Main street; Harold A. Forbes, 241 Maryland street, and Lillian B. Dietz, 40 Laurel street—all in Buffalo, New York. To manufacture rubber products.

S. & S. Rubber Co., Inc., June 30 (New York), \$5,000. William Reidfeld, G. A. Cymberg and Leo Kraus—all of 299 Broadway, New York City. To manufacture rubber products.

Standard Asphalt & Refining Co., June 30 (Delaware), \$5,000,000. James M. Satterfield, L. B. Phillips and J. B. Bailey—all of Dover, Delaware. Principal office in the State of Delaware

is with James M. Satterfield, Esq., Dover, Delaware. To buy, sell and develop all kinds and grades of gas, petroleum, etc.

Tennessee Tire & Supply Co., June 18, (Tennessee) \$10,000. C. W. Parker, A. C. Mahan, Lee M. Ross, W. L. Smith and J. J. Bryant. Principal office, 400 N. Gay street, Knoxville, Tennessee. To handle a general retail business of auto supplies, tires, etc.

Tire Outlet Co., Inc., July 12 (New York), \$1,000. Sydney Bernheim, 35 Nassau street, New York City; Catherine A. Weldon, 591 Seventh street, and Harry H. Jacobson, 55 Grand street—both in Brooklyn, New York. To manufacture tires.

Union Rubber Co., July 7 (New Jersey), \$35,000. Oswald Nitschke, Ashwood avenue, John Hiller, Jr., Twenty-first street; Willima Pettit, Twenty-second street; Frederick Kautz, Twenty-second street—all in Kenilworth, New Jersey. Principal office, Michigan avenue and Boulevard, Kenilworth, New Jersey. To manufacture rubber products.

MUNGER WINS RIM DECISION.

THE suit of Louis de F. Munger against the Perlman Rim Corporation for infringement of the Munger Rim Patent No. 638,588 of December 5, 1899, has been decided in favor of the plaintiff by Judge Manton, who directed the defendant to account before a master that the plaintiff may recover a reasonable royalty under the rule established in *Dowagiac Manufacturing Co. v. Union Plow Co.* The validity of the Perlman patent is not affected by the decision. The defendant will appeal the suit.

In the opinion of Judge Manton, the Munger patent and Perlman rim alike employ a wedge to secure a tire-carrying rim under tension on a motor car wheel so that the rim shall hug the wheel tightly and be held firmly in position while at the same time it can be detached readily by freeing the wedge surface. The Munger patent, however, antedates Perlman's claims. It is understood that damages, estimated on a basis of reasonable royalty, as stated by Judge Manton, may be recoverable against other rim manufacturers for a period of about 5½ years preceding the expiration of the Munger patent on December 5, 1916. Munger claims that nearly 20 companies have manufactured about 5,000,000 rims infringing his patent, and will probably insist on \$1.50 a set, Perlman's own valuation placed on Standwell rims, as the proper figure.

The Munger rim patent was issued in 1899 to the International Wheel & Traction Co., to which he had assigned his rights. The International lacked capital at the outset and the rims were made for a while by the Munger Vehicle & Traction Co. at New Brunswick, New Jersey. Litigation with the Rubber Goods Manufacturing Co. ensued, and the Munger rights next passed to the National Wheel & Traction Co. This was succeeded in 1902 by the Munger Automobile Tire Co., of Trenton. In 1915 the patent was assigned back to Munger individually.

Should the Munger decision be sustained by the United States Circuit Court of Appeals, the Munger patent would then head the list of wedged-on demountable rims. Meanwhile, however, Erle K. Baker, of the Universal Rim Co., is suing Perlman in Chicago, claiming violation of numerous patents covering the practice of mounting a rim upon a conical seat. Apparently the courts must decide what constitutes a wedge before the present complicated tangle of rim patents can be straightened out.

PERLMAN RIM CORPORATION MOVES HEADQUARTERS.

Alfred P. Sloan, Jr., president of the United Motors Corp., has taken over the management of the Perlman Rim Corp. He has selected Clarence M. Day as his representative in that company, and he has accordingly been elected as president. The head offices of the Perlman Rim Corp., heretofore maintained in New York City, have been removed to the plant at Jackson,

Michigan, which will enable the new president to keep in close touch with the manufacturing end of this corporation.

FRANK E. TITUS.

FRANK E. TITUS, who has just been appointed assistant manager of the foreign sales department of The B. F. Goodrich Co., has shown a steady upward progress in responsibility ever since he entered the employ of that company in 1906. He is a young man, acknowledging July 22, 1884, as the date of his birth at Painesville, Ohio. After a grammar school education at Cleveland, Ohio, and a high school graduation at Bellevue, Ohio, he was employed by the Nickel Plate Railroad for three years and then for a single year with the Ohio Cultivator Co.



FRANK E. TITUS.

In December, 1906, he became clerk in the engineering department of The B. F. Goodrich Co. Four years later, he went to the Buffalo branch of that company as assistant to W. O. Rutherford, then the local Buffalo, New York, manager, but now

general sales manager of the company.

Mr. Titus later was the man in demand. He was appointed manager at Denver, Colorado, only to return to Buffalo as operating manager. Then he was made manager of the Pittsburgh, Pennsylvania, branch in 1914, only to return to the Buffalo store and assume full management last year. Now that the foreign sales department of the company demands a man who has made good, who has been tried and proven, Mr. Titus is again promoted, and is made assistant manager of that department. His past record is an assurance of his success in his new position.

Mr. Titus is a member of the Rotary Club and the Buffalo Chamber of Commerce, in both of which he has always taken an active interest. He is also a Knight Templar and a "Shriner."

THE GOODYEAR'S NEW CANADIAN FACTORY.

The Goodyear Tire & Rubber Co., of Canada, Limited, Toronto, Ontario, has practically completed its new \$1,500,000 factory at New Toronto, a suburb of the city. This is a four-story structure 560 by 100 feet, and has one of the most up-to-date power plants in Canada. This power plant has sufficient capacity for three more similar buildings, and the company has land sufficient for five more units, similar to the one now completed. This factory, which will soon be in operation, has a daily capacity of 3,000 automobile tires. All kinds of pneumatic tires—automobile, motor-cycle, bicycle and airplane—will be made. At the Bowmanville, Ontario, factory will be manufactured mechanicals, molded goods and shoe supplies.

PEARCE-ARROW'S NEW FACTORY.

The Pearce-Arrow Tire & Rubber Manufacturing Co., Philadelphia, Pennsylvania, is starting alterations in its newly acquired plant at Twenty-first and Clearfield streets in that city, and expects to begin manufacturing there some time before the first of next year. This plant, consisting of five communicating buildings of modern brick construction, will give the company a capacity of 1,000 tires a day.

THE CARLISLE CORD TIRE.

The Carlisle Cord Tire Co., Inc., notice of whose incorporation appeared in the June, 1917, number of THE INDIA RUBBER WORLD, will soon put upon the market a cord tire, the invention of F. B. Carlisle, not only novel in itself but made upon equally ingenious yet simple machines designed and constructed by the same inventor. The carcass is made from cotton cord of large diameter, having a tensile strength of 235 pounds. Each cord is surrounded with rubber, which, it is claimed, almost entirely eliminates internal friction. The tread is novel, consisting of two parallel depressions resembling zigzag streaks of lightning, which provide effective non-skid qualities.

The company has secured an entire floor in the fine tire factory of the Tyer Rubber Co., Andover, Massachusetts, where the cord-laying machines are already at work. The vulcanizing is being done by the Tyer Rubber Co., but all other details of construction are entirely separate and distinct from the latter named concern.

The officers of the Carlisle company are: President J. S. Bretz; vice-president, F. B. Carlisle, the inventor; treasurer, Frank Williams, president of the Broadway Central Bank, New York City, and secretary, Frank A. Searles. The general sales manager is Charles A. Gilbert, formerly Pacific Coast manager, United States Tire Co. The principal office is at 250 West Fifty-fourth street, New York City.

THE ROOF GARDEN OF THE COLORADO TIRE & LEATHER CO.

On the evening of June 25 the new roof garden of the Colorado Tire & Leather Co., Denver, Colorado, was opened by a formal dance given by the Executive Club, which is composed of department managers and their first assistants. Speeches were made by officers of the company.

The roof garden was constructed at a cost of approximately \$15,000, and is intended primarily for the social entertainment of employees of the company and their friends. It also affords



an opportunity to obtain well-cooked food practically at cost.

Bert Rhoads, architect for the company, worked out the design. The entrance is surmounted by a glass canopy and a large summer house, to be used as a banquet hall, ball room and lunch room, is the principal feature of the scheme. Swings, rustic benches and tea tables invite relaxation during the lunch hour and also evening amusement if desired.

NEW FISK RUBBER BRANCH AT NASHVILLE.

The Fisk Rubber Co., Chicopee Falls, Massachusetts, is to erect a handsome permanent branch in Nashville, Tennessee, on Eighth avenue, north, and extending through to Ninth avenue. The plans being prepared by Marr & Holman, architects, call for a sales and stock room and also a service station, to be equipped with all modern machinery necessary for repairing tires. The building will be of tapestry brick and thoroughly up to date in every particular. W. E. Cunningham is local manager for the Fisk company.

PERSONAL MENTION.

W. H. Taylor, of Chicago, has become resident manager of the Peoria, Illinois, branch of the United States Tire Co. Mr. Taylor was formerly engaged in specializing among jobbers for United States tires.

William Jameson, assistant superintendent of The Fisk Rubber Co., Chicopee Falls, Massachusetts, has presented the Chicopee Public Library with a magnificent mounted moose head which has been placed in a prominent place in the children's room.

Mark W. Roe, who has just resigned as mechanical and efficiency engineer for the McGraw Tire & Rubber Co., East Palestine, Ohio, to accept a similar position with the Republic Rubber Co., Youngstown, Ohio, has been connected with the rubber industry since 1906, when he became mechanical engineer for the Diamond Rubber Co., Akron, Ohio. He graduated from Cornell University in 1896 and for two years was an assistant instructor there, the next seven years serving engineering and textile concerns, an experience well fitting him for his later work in the rubber industry.

A. T. Severs, formerly assistant manager of the Minneapolis, Minnesota, branch of the Firestone Tire & Rubber Co., Akron, Ohio, has been appointed manager of the Fargo, North Dakota, branch, succeeding W. R. McCarthy resigned.

R. T. Jollie, Jr., has been appointed supervisor of the Ajax Rubber Co., New York City, in Ohio, West Virginia and Kentucky.

B. F. Wulff, formerly connected with the San Francisco and later with the Chicago branch of The Kelly-Springfield Tire Co., has severed his connection with that company to become associated with the McCreary Tire & Rubber Co., Indiana, Pennsylvania, as manager of their sales department.

Robert Cartmell, who has made an enviable record in the Los Angeles, California, branch of the Kelly-Springfield Tire Co., New York City, has been placed in charge of the sales of solid truck tires at the general sales offices of the company, Cleveland, Ohio, where he will work with general sales manager Otis R. Cook.

Charles Schoneman, who has done excellent work in Hackensack, New Jersey, and Baltimore, Maryland, also more recently as division manager, for the Sterling Tire Corp., Rutherford, New Jersey, has been appointed manager of the new Chicago, Illinois, branch of that company.

L. W. Santasiere, formerly with the New York branch of the Firestone Tire & Rubber Co., Akron, Ohio, has been appointed a foreign traveler for the company. He sails shortly for the West Indies, where he will do general sales promotion work.

R. W. Brouse, formerly assistant manager of the Philadelphia (Pennsylvania) branch of The B. F. Goodrich Co., has been promoted to the managership of the company's branch at Buffalo, New York.

IMPERIAL BELTING CO. PROMOTIONS.

Harry E. Dennie, for several years Pacific Coast manager of the Imperial Belting Co., Chicago, Illinois, has been appointed general manager of the company.

W. S. Bloomer, formerly special representative throughout the Western States, has been appointed general sales manager.

Both were originally Chicago men who will be welcomed to their former fields of operation by many friends in the trade. The transfers were made necessary by the rapid expansion of the business and the determination to render the same painstaking service which their many satisfied customers have received in the past.

ACCORDING TO THE "NEW YORK SUN" THE NEED OF RUBBER IN Germany for the uses of war has become so great that even billiard tables are being stripped of their cushions.

TRADE NEWS NOTES.

Charles A. Be Saw, president, and P. P. Parker, general sales manager, of the Be Saw Tire & Rubber Co., have opened temporary offices in the Whittington Hotel, Ardmore, Oklahoma, near the site selected for the new tire factory, contracts for which have been let.

The Ideal Tire & Rubber Co., Cleveland, Ohio, has secured a plot of about 15 acres, in that city, with a good water front and adjoining two railroads. A factory will be erected large enough to turn out 500 casings and 800 tubes per day. The contract for this building has already been awarded.

A conference of division managers of the Marathon Tire & Rubber Co. was held the first week of July at the home office, Cuyahoga Falls, Ohio, to consider taking care of greatly increased business and the national advertising campaign the company is about to launch. H. H. Replogle, manager of sales, gave a dinner to the division managers in conference. The spirit of an unmistakably live and energetic organization was very evident.

A factory for the Crown Tire & Rubber Co., Ralston, Nebraska, is being erected, and it is expected that one floor will be ready for use about August 15. Meanwhile, Crown Cord tires and tubes are being made in a temporary plant. As the business grows, enlargements are to be made to the new plant, according to well defined plans already drawn which contemplate several wings.

The Norwalk Tire & Rubber Co., Norwalk, Connecticut, by leasing the Ash hat factory in South Norwalk, has made it possible to more than double the production of Norwalk tires without waiting for building operations. This arrangement, together with the large addition to the Norwalk plant, now in course of construction, is expected to treble the output next year.

The Lee Tire & Rubber Corp., Conshohocken, Pennsylvania, has developed a cord tire embodying its well-known puncture-proof feature and arrangements are now being made to manufacture them largely for the 1918 output. John Kearns, general manager, expresses the utmost confidence in cord construction and is of the opinion that by 1919 tire manufacturers will be making cord types of tires in greater quantities than the regular fabric type.

Eddie Lingenfelder and Fred C. Rounds are operating an automobile accessories business under the name of Eddie Lingenfelder Co., at 831-3 South Olive street, Los Angeles, California. The store is a Goodyear Service station.

The Cleveland Standard Tire & Rubber Co., notice of whose incorporation appeared in the July issue of THE INDIA RUBBER WORLD, acts as Southern California agent for the tires of the Standard Tire & Rubber Co., of Willoughby, Ohio. The office is located at Pico and Hill streets, Los Angeles, California, officers of the company being as follows: H. M. Lieb, president; E. B. Conlee, vice-president and general manager; E. Leon Sprague, secretary.

The Knight Tire & Rubber Co., Dallas, Texas, has removed to new quarters on Commerce Street.

The Giant Tire & Sales Co., Rochester, New York, expects to have its new Giant tire on the market within the next few months. The company was incorporated in April for \$10,000.

The Perfection Rubber Works, Stamford, Connecticut, has taken a five years' lease of a three-story factory building on Garden street, and will commence manufacturing as soon as the necessary machinery can be installed.

The Boone Tire & Rubber Co., Sycamore, Illinois, has awarded the contract for the erection of the first unit of a third plant to be located at Chippewa Falls, Wisconsin, to cost about \$125,000 complete. Work is already under way and it is hoped to get the plant into operation on August 15 or September 1. The building will be 100 by 200 feet, one and two stories. Elec-

tric motors aggregating more than 300 horse power are to be installed. The main plant of the company is located at Sycamore, Illinois, and a second plant at Des Moines, Iowa.

NEW PORTAGE RUBBER CO. BRANCHES.

B. J. Wildman, who has been made Pacific Coast manager for the Portage Rubber Co., recently opened two direct branches that will be operated under the name of the California Corp., and are located at 855 Traction avenue, Los Angeles, California, and 745 Mission street, San Francisco, California.

The Portage Rubber Co. also operates direct branches at Boston, Massachusetts; New York City; Philadelphia, Pennsylvania; Detroit, Michigan; Cleveland, Ohio; Atlanta, Georgia; Chicago, Illinois, and Des Moines, Iowa.

John H. Diehl is no longer connected with the company and his successor has not yet been appointed.

KELLY-SPRINGFIELD CUMBERLAND PLANT IN PROGRESS.

Final plans have been completed for the new Cumberland, Maryland, plant of the Kelly-Springfield Tire Co., New York City, which is now in process of erection at a cost of between \$4,000,000 and \$5,000,000. The location was chosen as a result of the tempting offer of the land, a bonus of \$750,000 and ten years' tax exemption. The new plant will employ between 3,000 and 5,000 persons at the start and will have a capacity at least double that of the existing plants, including that acquired two years ago at Wooster, Ohio, and that bought early this year at Buffalo, New York.

The company has never attempted quantity production, but the increasing demand for Kelly-Springfield tires has made this important expansion necessary. Never in its history has the company been so far behind on its orders. Gross and net are both showing very large gains over the year to December 31, when a balance of 39 per cent remained for the \$4,907,000 common stock after preferred dividends had been deducted. It is now paying 16 per cent, or \$4 per share, and officials believe it will earn very close to 50 per cent this year.

RACINE AUTO TIRE CO.

The daily production of this firm at Racine, Wisconsin, is to be raised to 7,500 Horseshoe tires and tubes by the erection of new buildings and increase of the force to between 3,000 and 4,000 persons. The new plant will occupy a plot 260 by 320 feet, will be five stories high, and divided into units 60 feet wide with courts 30 feet wide between sections. Reinforced concrete will be used, and the latest machinery and electrical equipment will be installed.

This growing firm began business seven years ago with three workmen and has practically trebled its output in each of the past three years, sales up to June 1, of this year, being 20 per cent greater than for the entire year 1916. For the past year and a half the plant has been in operation day and night, turning out 500 tires and tubes daily for seven branches in the principal cities of the Middle West. The factory is now 60 days behind orders, and because of limited facilities has not been in a position to take on new accounts for over a year.

The officers of the company are L. J. Elliott, president; C. H. Wright, secretary and treasurer.

WILL WHOLESALE ONLY.

The Berrodin Rubber Co., Philadelphia, Pennsylvania, which has been doing a wholesale and retail business in tires and accessories at 713-715 Broad street for the past year, has discontinued its retail department, and will hereafter confine its business exclusively to the wholesale end, catering to garages and supply stores.

THE RUBBER TRADE IN AKRON.

By Our Regular Correspondent.

THE northward migration of negroes is becoming a problem in the Middle West. To Ohio, it is estimated, have come during the past year or two 100,000 of the 700,000 blacks who have been known to leave the South seeking advancement. Attracted by the good wages paid by rubber manufacturers, the negro population of Akron has doubled within a year and now numbers about 3,000. A newer and larger negro district with opportunities for thrifty blacks to buy homes on the instalment plan will go a long way toward making the best of the situation, and such a movement must, of course, be worked out by leading business men in conjunction with representative negroes long resident in the city. Given proper home influences and a fair opportunity to work, it is believed these newcomers will become frugal, industrious, law-abiding citizens.

Leading Ohio negroes, ministers, teachers, social workers and members of the State War Board, realize the duty confronting them, and on July 12 some 200 met in Columbus to discuss how to house the negro, how to avoid race troubles, how to make good citizens out of southern negroes, how to put it up to the better class of negroes to see that the newcomers are disciplined, and how to improve the moral conditions in negro districts. Rev. R. A. Jones, pastor of the Second Baptist Church and prominent in negro circles, was present from Akron.

* * *

The regular annual convention of the service men of the Firestone Tire & Rubber Co., at Akron, is an institution of no inconsiderable business and social value to those connected with the large organization, coming from all over the country to meet together at the home office. This year, owing to conditions in national affairs, it was decided to abandon the elaborate plans that had been made for the service convention. But in order not to forego the benefits of this comprehensive review of the year's work and plans for the year to come, the novel plan was adopted of bringing the mountain to Mahomet, or specifically, the convention to the men, instead of the men to the convention.

Various members of the Akron organization who had planned to address the service men during the convention prepared their speeches in written form, one of these being a very interesting treatise by G. R. Lamson, in charge of the Firestone Library, on the value of "courtesy" and "good will" as business assets. These printed talks are being sent periodically to the men in the various cities where the company is represented by branches or agencies.

The stock for which Firestone employes have subscribed under the company's plan to allow its workers to become stockholders will be held by the firm should the employe enlist or be drafted into any branch of government service, payments being postponed.

* * *

The Mason Tire & Rubber Co., at Kent, this state, is progressing with remarkable rapidity. Net earnings for the quarter to July 1 were at the rate of \$300,000 per year. During the past two months the company has paid eighteen months' accumulated dividends due on the 7 per cent cumulative stock. The fore part of August the dividend due on preferred stock from January 1 to July 1 will be paid, and thereafter the preferred stock will be upon a quarterly dividend basis.

Four extensions to the plant are in progress, including a warehouse, mill room, main plant extension and office building. The present average production is 500 tires per day, and by the first of January it is planned to extend the capacity of the plant to 1,500 tires per day.

Four direct factory branches are maintained, at Akron, Cleveland, New York and Kansas City, and additional branches will be opened in the near future. The company is making a popular priced line of plain, ribbed, and non-skid tires and will

have a cord tire on the market by the first of next year.

Recent important acquisitions to the office personnel are Dave Kennedy, formerly advertising manager of the Swinehart Tire & Rubber Co., and John H. Diehl, sales manager, formerly with the Portage Rubber Co. in the same capacity.

* * *

The books of The B. F. Goodrich Co. were closed on July 1 for the purpose of determining the result of operations for the first six months of 1917. They have not been audited by public accountants, but the company's auditor has just submitted to the directors a statement of earnings for the period. After making full provision for maintenance charges, depreciation, doubtful accounts, and all known outstanding current liabilities and accruals, the net profits for the period amounted to approximately \$5,200,000, exclusive of provision for excess profits tax not yet ascertainable.

The Goodrich school offers all employes an opportunity to learn English, free of charge, the classes being arranged so as to make it possible for workers on all shifts to participate. Upon the request of a number of employes, who have realized the growing importance of Spanish as a commercial language, classes for the study of Spanish have also been instituted under the direction of Dr. Juneke.

W. A. Johnson, former assistant, has become office manager of the automobile tire department of The B. F. Goodrich Co., succeeding A. J. Wills, who has assumed special duties in association with H. C. Miller, director of tire sales. Mr. Johnson was at one time general sales and advertising manager of the Pierce Cycle Co., Buffalo, New York.

The Goodrich Girls' Country Club, now being completed at Rex Lake, nine miles south of Akron, is for Goodrich women employes exclusively. Tennis and croquet courts are now being laid out.

* * *

The Goodyear Tire & Rubber Co., in connection with the city of Akron, held a mammoth celebration of Independence Day at the company's recreation park, known as Seiberling Field. There was a grand review of Akron boy scouts and scoutcraft exhibitions, a base ball game, and a concert, followed by a community song festival, the largest affair of the kind ever held in Akron and this part of the country.

A fire on June 16 in one of the concrete storehouses of the Goodyear company, believed to be due to spontaneous combustion among the many compounding ingredients kept in the structure, resulted in damages estimated at \$40,000. None of the manufacturing departments was affected.

* * *

The Amazon Rubber Co. has established a thoroughly equipped chemical research laboratory with H. G. Arbogast in charge. Mr. Arbogast was formerly assistant chemist in one of the large local rubber companies.

* * *

J. W. Rock, vice-president of The American Rubber & Tire Co., Akron, Ohio, announces the marriage of his daughter, Hazel Kirk, to George A. Madole, who is connected with The B. F. Goodrich Co. in a technical capacity.

THE RUBBER TRADE IN BOSTON.

By Our Regular Correspondent.

SOME of the rubber factories in and around Boston are preparing to shut down a part of this month, but not on account of lack of business. All of them seem to have enough orders on hand to warrant running right along, were the weather better for good work, the employes less desirous of a let-up and a vacation period, and were there no repairs and installations necessary. The rubber shoe factories are pushing ahead on both rubber footwear and tennis goods, for orders keep coming for

the fact that the summer is half gone. This state of affairs applies equally to the Boston Rubber Shoe Co. and the Converse Rubber Shoe Co., of Malden, The American Rubber Co., of Cambridge, the Apsley Rubber Co., of Hudson, and the Hood Rubber Co., of Watertown. The belting and packing factories are also busy, the Boston Woven Hose & Belting Co. rushing in practically all its departments, while the demand for jar rings is in millions. The Boston Belting Co. has been running double or triple time a portion of the last two months. The Apsley Rubber Co., Hudson, and the Franklin Rubber Co., of Malden, are making ponchos on government contracts. The Revere Rubber Co., of Chelsea, was never busier, and the same reports or similar ones come from the makers of coated fabrics and artificial leather for carriage and automobile tops and upholstery.

The Hood Rubber Co. plant, with its recent enlargements, mentioned in a former letter, is just buzzing with industry, and the output shows the remarkable progress of the company's business. The daily product of this big plant includes 40,000 pairs of rubber boots and shoes, 36,000 pairs of canvas footwear, 750 tires, 600 tubes and 80 solid rubber tires. Few companies in the industry can boast of greater progress than has been made by the Hood Rubber Co., which started in one small factory not so very many years ago.



J. H. WILLETT.

The Goodyear Tire & Rubber Co. salesrooms in this city are on Boylston street in the automobile district, where the company occupies a handsome business building including fine showrooms. But this is certainly an inconvenient place for footwear men to visit and the company has just opened a sample room for the sale of its "Neolin" soles in the heart of the shoe and leather district, at 283 Essex street. This office is in charge of J. H. Willett, who serves as special representative for these soles to the wholesale trade. Mr. Willett has a wide acquaintance in the footwear trade, having traveled over the entire country for prominent firms as well as with shoes made in his own factory. His retirement from the shoe manufacturing business a year or two ago was preliminary to forming this business connection with the Akron company for presenting to the shoe manufacturers of the country the advantages of this now well-known substitute for leather, used in bottoming shoes.

The Fisk Rubber Co., Chicopee Falls, this state, has one of the largest and most successful factory athletic organizations in the country. It is organized under the name of the Fisk Athletic Association, and is a registered member of the A. A. U. Some 2,500 employees, with paid-up memberships, are enrolled. The activities are all in the hands of the employees, governed by elected officers and committees, and a board of directors. It not only supports an all-star baseball team, known as the "Red Tops," but conducts a league of six teams, all Fisk workers, and these teams are playing excellent baseball, and affording recreation for the employees of all departments. As has been previously mentioned in these columns, the company has a fine athletic field, 20 acres in extent, where these games are played, and where other athletic sports are indulged in by the workers at the factory. The association has furnished uniforms, bats, balls, bases, etc., for these teams, between which much good-

natured rivalry abounds. A recent success of this association was the staging of a first-class track meet, to which were attracted a number of the leading amateur and college stars of New England.

E. M. & F. Waldo, manufacturers and dealers in compounding ingredients and colors, New York City, have opened an office in the new Rice Building, 10 High street, Boston, in order to take better care of their increased business in this territory. This office is in charge of Townsend H. Cushman, who has been with the house for several years and is well known to the New England trade.

The Pneumatic Cushion Inner Tube Co., of this city, which is exploiting a rubber cushion filler to take the place of an air-filled inner tube, has made arrangements to have its product manufactured at Canton, this state. It is rumored that there is a possibility that the government will adopt this non-collapsible tube for army vehicles.

Ellis F. Harlow, son of President Robert C. Harlow, of the Monatiquot Rubber Works Co., South Braintree, has enlisted in the First Massachusetts Engineers, which regiment will be called on July 25. This regiment was formerly known as the First Corps Cadets, whose history dates back to 1776.

THE RUBBER TRADE IN RHODE ISLAND.

By Our Regular Correspondent.

APPLICATIONS that are interesting to the rubber industry have been made to the Warren Town Council for exemption from taxation on proposed new buildings and land of three corporations which are contemplating locating in Warren. The petitions were received at a meeting of the Town Council early in the last month and after an informal consideration were continued for action at some future meeting.

The corporations seeking exemption from taxation for ten years are the American Web Co., which is to manufacture narrow fabrics, and is located at Boston; the Deaudelion Fabric Co., to manufacture tire fabric, and the Lynn Manufacturing Co., of Lynn, Massachusetts, manufacturing rubber heels, soles and arch supporters. The town clerk was authorized to correspond with these concerns, notifying them to send representatives to confer with the members of the council.

A chicken dinner and an extended program of athletic contests featured the annual outing of employees of the Davol Rubber Co., Providence, July 14, at Doby's Grove. With respites for dinner and luncheon, the sports continued from the arrival of the party in special electric cars shortly after 9 o'clock until 4 o'clock, after which dancing became the form of entertainment. Prizes in the sport events were awarded.

The National India Rubber Co., Bristol, has had a considerably higher valuation placed upon its property in that town by the tax assessors this year than that in 1916, following the construction of numerous additional buildings, the improving of the old structures and the introduction of new machinery and equipment. The valuation now is \$790,000. Last year it was \$555,000. The company will pay a tax this year of upwards of \$13,000.

One of the most attractive features in the Fourth of July parade at Bristol was the appearance of 60 young women employed in the stitching room of the National India Rubber Co., who paraded as Red Cross nurses.

The Bourn Rubber Co., Providence, is calling for experienced shoemakers, also young women to learn.

A contract has been given for the erection of a building for

office and shipping room at the Anchor Webbing Co.'s plant, Pawtucket. The new building will be brick, mill construction, 53 by 60 feet, two stories, to cost \$12,000.

An extensive system of fire escapes has recently been placed on the buildings at the plant of the Atlantic Tubing Co. at Knightsville.

Hill & LaCrosse, manufacturers of elastic webbings, have been building an extension to their plant at Howard.

The Revere Rubber Co., Providence, is calling for girls over 16 years of age, for warping and table work, in its rubber thread department. The concern is very busy and is furnishing employment for a large number of new hands in the various departments.

The Bay Spring plant of the International Rubber Co., at West Barrington, has been working on night and day shifts the past month to fill orders for a carload of rubber goods a day. It is expected that this schedule will be continued indefinitely.

THE RUBBER TRADE IN TRENTON.

THE Home Rubber Co., manufacturing mechanical rubber goods, has acquired a 50 by 100 foot site, adjoining its plant for the erection of an addition.

Sensible one-piece bloomers and blouses of durable, medium-weight blue fabric are being adopted by the girls employed by the Semple Rubber Co., maker of inner tubes. The wider employment of women in rubber and other manufacture everywhere



seems inevitably to be leading to this dress reform which appears to have come to stay. It provides a comfortable working uniform permitting full freedom of action and saving the street clothing.

The Dural Rubber Corp., recently incorporated with a capital stock of \$200,000, has acquired a five-acre site with buildings at Flemington, New Jersey. The main structure, 40 by 200 feet, is a model of its kind, embodying the day-light feature and served by a spur track from three railroads. The new works will be devoted to the manufacture of aircraft rubber equipment, automobile tires, tubes, sundries and molded rubber goods, which will be sold under the registered name of Dural.

The officers of the company are Edgar H. Wilson, president and general manager; W. C. Ehrenfeld, vice-president; Caleb S. Green, treasurer; G. F. Gingen, secretary. The directors include Newton A. K. Bugbee, comptroller of the State of New Jersey; J. E. Gill, J. G. Conner and J. R. Hall.

RUBBER TRADE INQUIRIES.

THE inquiries that follow have already been answered; nevertheless they are of interest not only in showing the needs of the trade, but because of the possibility that additional information may be furnished by those who read them. The editor is therefore glad to have those interested communicated with him.

[310.] Names of manufacturers of a machine for making rubber balls or bulbs are requested.

[311.] A correspondent wishes to know where he may obtain rubber poker chips.

[312.] Names of manufacturers of serial numbering machines for stamping numbers on thin metal strips, are sought.

[313.] An inquiry has been received for names of manufacturers of machinery used in making adhesive tapes.

[314.] Names are desired of makers of machines used for applying starch, bone black and other powders to sheet rubber.

[315.] We have an inquiry for gasoline cans used by tire makers.

[316.] Tire building machines are sought.

[317.] A correspondent desires to be furnished with a list of manufacturers of aldehyde ammonia crystals.

[318.] A correspondent wishes to know where the various parts for fountain pens may be obtained.

[319.] A correspondent is in the market for a fabric inspection machine.

TRADE OPPORTUNITIES FROM CONSULAR REPORTS.

A complete collection of samples of various prices, discounts, etc., of imitation leather is desired by a firm in the British West Indies. Report No. 24,742.

An agency is desired by a company in Italy for the sale of vulcanized fiber and ebonite. Report No. 24,770.

A firm in Italy wishes to purchase imitation leather. Report No. 24,775.

A company in Sweden desires to be placed in communication with American manufacturers and exporters of rubber, automobile tires, etc. Report No. 24,778.

An agency is desired by an applicant in Italy for the sale of artificial leather. Report No. 24,780.

A man in France wishes to represent American manufacturers and exporters of artificial leather and leather substitutes used for automobile tops, etc. Report No. 24,785.

Catalogs and price lists are desired by a man in Spain for rubber hose. Report No. 24,843.

An import agent in Russia desires to be placed in communication with American manufacturers or exporters of pneumatic tires. Report No. 24,845.

Communication is sought by a business firm in Russia with American dealers in raw rubber. Report No. 24,864.

Quotations are desired by a firm in East Africa for lead pencils, with and without erasers. Report No. 24,867.

A dealer in haberdashery goods in East Africa wishes to purchase cheap grades of men's garters. Report No. 24,901.

A manufacturer's agent and importer in New Zealand wishes to be placed in touch with manufacturers of all sizes of suit cases, in canvas, fiber and imitation leather. Report No. 24,962.

A company in the Dutch East Indies desires to purchase rubber and linen collars and cuffs for army officers. Report No. 25,004.

OLD RUBBER AND RUBBER HOSE ARE AMONG THE MATERIALS condemned as unfit for use and listed to be sold at the Navy Yard, Puget Sound, Washington. The sale will be for cash to the highest bidder by sealed proposals to be opened at 1 p. m., August 17, 1917. Schedules containing form of proposals can be obtained upon application to the Supply Officer, Navy Yard, Puget Sound, Washington.

The Rubber Trade in Great Britain.

By Our Regular Correspondent.

WITH regard to business conditions generally there is no change of note to record in the situation, which may be summed up in the statement—great activity where government contracts are concerned and slackness amounting in cases to depression in general home and export business. The bogey of dearer rubber has been scotched by large arrivals and there is now no rush to provide for anticipated needs. The topic of the moment is the price of cotton rather than rubber, and there seems little doubt that a more or less prolonged era of short time or knocking off of a certain number of looms, which amounts to the same thing, is in store for Lancashire.

A sensation of the first half of June was the rapid appreciation in the market value of the Parent Tyre Co., Limited, (Dunlop) on account of the anticipated combination among tire manufacturers which at the time of writing has not yet matured, or, at any rate, been announced.

With regard to the market premium on Brazilian Para rubber this is really to-day a greater compliment than it was five or six years ago when the premium was the same, and this because it is generally noted in the trade that the loss in washing is higher than it was, *viz.*, 18 or 19 per cent more against the old figures of 15 or 16 per cent. This is put down to the greater rapidity in getting the rubber in the market and the consequent decreased loss of moisture by evaporation.

RUBBER-FACED CARD CLOTHING

A branch of the rubber industry which has been hit by the war is that of rubber-faced card clothing for use in textile mills. Not only is the export trade disorganized but the regulations with regard to the sale and purchase of the steel rods from which the wire joints are made are such as cause difficulties and embarrassment in the manufacture. This business is carried on in various factories in Lancashire and Yorkshire, specially devoted to it and not in what may be termed rubber works proper. Some of the card clothing is made with vulcanized rubber and some with pure rubber and the old rubber from the latter, always of the best quality, is constantly in demand by reclaimers.

RUBBER RECLAIMING.

This leads me to refer to the fact that a new reclaiming works has been started at Fielding Mills, Middletown, near Manchester, by Stead-Hunt, Limited, which, if my memory serves me rightly, was a name associated with the artichoke synthetic rubber business which commenced its short-lived career at Handforth four years ago. The new reclaimed rubber is called Russam and is said to be made by an entirely new and original process with the use of acid or alkali. Of course, a good deal of rubber has been reclaimed in the past, and is no doubt at present, without the use of acid or alkali, but it will be for the astute rubber manufacturers to determine whether reclaimed made without acid or alkali is superior to that made with these auxiliaries, and the matter can safely be left to their judgment. It has surprised many readers on this side to see in a recent number of THE INDIA RUBBER WORLD a reference to a legal decision regarding the alkali patents. Presumably the explanation is that patents have a longer life in America than they have here, any extension of a patent over its 14 years' span being very rare with us. With the expiry of the Mark's "alkali" patent in England four years ago there is now no question of any litigation among the three or four concerns working the alkali process in England.

Delivery of rubber machinery to orders which are readily quoted for and taken is still a matter of great delay and un-

certainty and is the main reason for the slight progress made with regard to projected developments.

A BIRTHDAY HONOR.

Sir Frederick H. Smith, Bart., has been created a baron of the United Kingdom and has taken the title of Lord Colwyn, from the resort on the North Wales coast, where he has a residence. Although a commercial magnate of varied activities and business associations, he is, of course, best known to the rubber trade as chairman of the Charles Macintosh Co., Limited, and some of their subsidiary undertakings. Better known in Lancashire than in London, it was not altogether surprising that on one occasion a few months ago, when his name became prominent in connection with the report of a tariff committee, some of the London papers confused him with Sir Frederick Smith, the Attorney-General. The latter, who is a Unionist, does not see eye to eye with the new peer, who belongs to the opposite camp. So, no wonder certain leading writers were bewildered at what seemed a very rapid change of opinion even in these days of chameleon procedure.

DISASTROUS FIRE.

On June 13 a fire, followed by an explosion, occurred at the works of the Hooley Hill Rubber & Chemical Co., about seven miles from Manchester, with the result that the works were entirely destroyed, the managing director, H. S. Dreyfus, being among the 41 persons killed. The death roll was added to by persons in the vicinity of the works at the time of the explosion, a great many of those employed in the works having managed to get into safety when the alarm of fire was given. Mr. Dreyfus, no doubt, could have saved his own life had he not remained to see that others had warning and assisted in the attempt to subdue the fire. It was at this works that the experiments with accelerine (para nitroso dimethyl aniline) were carried out and a part of the business of the works recently has been the manufacture of this accelerator for sale to rubber works.

DUNLOP INCREASES ITS STOCK.

At a meeting of the shareholders of the Dunlop Rubber Co., Limited, London, on June 22, the capital stock was increased to £6,000,000 by the creation of 3,000,000 new 7 per cent preference "C" shares of £1 each, 10 shillings per share to be called up at once and the balance not for a year at least. The borrowing powers of the board of directors were also increased from £300,000 to £3,000,000.

So rapidly has the business of this company been growing, particularly in the new mill completed May 1 for the manufacture of solid tires for army transport, that last November £1,000,000 in 6½ per cent cumulative "B" preference shares were created in order to double the stock of raw materials as a war-time safeguard and to finance the manufacture and sale of solid tires. Raw stocks were, however, increased to over £2,250,000, an excess of £720,000 over and above the £750,000 intended for that purpose. This must be deducted for the fresh capital, and the balance, roughly £500,000 after the payment of expenses, will be used to finance greatly increasing normal business.

In his address moving these increases, Acting Secretary A. Cunningham referred enthusiastically to the cotton mills and rubber estates of the company, both of which investments had been made at a particularly fortunate time and had proved an unqualified success. The profits and savings of the mills had equaled their initial cost and equipment, and the profits of the estates, embracing 27,000 planted acres, were now approaching the profits made a few years ago by the Parent Tyre Co.,

Limited, and the Dunlop Rubber Co., Limited, itself. He also declared the rumor of the absorption of the shares of the Parent Tyre Co., Limited, or any amalgamation of that company with other British or American firms was unfounded. Negotiations had been in progress, but had been terminated and withdrawn.

SOCIETY OF CHEMICAL INDUSTRY.

This society has issued the first of its annual report on the progress of applied chemistry, Dr. Henry P. Stevens being the compiler of the section relating to india rubber. The reports form a useful and handy summary of recent progress in various trades and manufactures and are largely concerned with the work of the research chemist. The india rubber manufacturer, we all know, is not particularly communicative, so it is not surprising that the pages compiled by Dr. Stevens deal more with what may be described as pure chemistry than with actual works practice, abstracts of most of them having already come before those interested by way of the trade journals.

The society holds its annual meeting, now known as a chemical congress, at Birmingham this summer, and it is interesting to note that two papers by rubber works chemists are listed. One is on "The Chemistry of Vulcanization," by Dr. D. F. Twiss, of the Dunlop Rubber Co., Limited, and the other by B. D. Porritt, of the North British Rubber Co., Limited, on "The Scientific Needs of the Rubber Industry."

Among the works to be visited by parties of members is the Dunlop rubber factory, and it is requested that no one connected with the rubber industry will apply for a ticket. It is also stated that only members who are British born will be admitted at the present time to the majority of the works to which visits have been arranged.

THE INEQUITY OF THE EXCESS PROFITS DUTY.

Now raised from 60 to 80 per cent, the British excess profits duty in its relation to rubber producing companies is the cause of constant discussion and correspondence, leading, it is asserted, to glaring instances of inequity and absurdity in the manner of its application. In a letter recently addressed to all members of the House of Commons, suggesting an amendment to the Finance Bill before Parliament, in order to mitigate the handicap suffered by the younger companies, Messrs. Gow, Wilson & Stanton, London, showed the injustice of the so-called Vallambrosa judgment, in pursuance of which all expenditure of a recurring nature on maintenance during the immature stage of a rubber plantation, is deducted from the profits in order to compute the income for income tax, irrespective of whether the source of the funds for this expenditure is capital or not. This judgment, it was explained, affects illogically the progressive old producer and the young producer. For instance:

The old progressive producer planted up to 1906, 750 acres; in 1908-09, 700 acres; in 1910-11, 700 acres, making a total of 2,150 acres. The high profits derived from the old areas during 1911, 1912 and 1913 would be reduced to a fictitiously low level by subtraction of the cost of maintaining the still immature areas. But the profits from the 1908-9 and 1910 plantings coming into bearing after the war, would not be similarly reduced. Consequently the taxable incomes would work out as follows:

Year.	Actual profit.	Expenditure on immature area.	Statutory income.
Pre-war 1912.....	£30,000	£10,000	£20,000
Pre-war 1913.....	32,000	7,000	25,000
Post-war 1914.....	37,000	2,000	35,000
Post-war 1915.....	55,000	nil	55,000

On the other hand, the young companies formed in the years 1909 and 1910 with very small areas, subsequently received funds for the purpose of opening up large areas during 1911, 1912, 1913 and 1914. The small early plantings would naturally yield but little profit, whereas the later areas, coming into bearing after

1913, would throw off proportionately more and comparison of pre-war and post-war gains would show an excess profit which in fact did not exist.

CEYLON SHIPMENTS CURTAILED.

The British Shipping Ministry has ordered that Ceylon place rubber last in her exports to Great Britain, which means shutting it out altogether. This does not affect shipments to America and Australia. Strictly limited freights prevent large quantities from going to the latter country. It is, however, hoped that America will increase her imports, for while up to May 7 England obtained over 12,000,000 pounds of rubber against less than 7,000,000 last year, the United States bought under 6,500,000 pounds against 10,000,000 to date in 1916.

Meanwhile, Great Britain has given preference to the Federated Malay States, which have only rubber and tin, with coconuts a bad third, whereas Ceylon has several strings to its bow, notably tea and copra.

LABOR TROUBLES IN RUSSIA

MANUFACTURERS of rubber goods in Russia are having their full share of difficulties incident to the present social and political upheaval, according to the correspondent of the "London Daily Telegraph," who is quoted by "The Indian Rubber Journal."

It seems that one morning a delegation of 50 to 60 men, representing the 20,000 hands at the Petrograd works of the Treugolnik Rubber Co., went to the directors asking for a raise of 15 copecks an hour in wages since the beginning of the war and also settlement of a claim rejected by the courts several years ago. The total was 11,000,000 rubles, and they had all brought linen bags expecting immediate payment.

The directors, who had always prided themselves on the cordiality of their relations with their men, argued the case patiently but unavailingly, pointing out that the usual war bonus had been paid, that privileges not enjoyed in other factories had been extended, and explaining the impossibility of meeting such demands. Reference to the Central Board of Conciliation was suggested, but the men only threatened to throw the directors into a nearby malodorous canal. It was then decided to request the Minister of Industry and Commerce to take over the management of the company, and the Minister of Justice and the Council of Workmen's and Soldiers' Delegates were notified to that effect.

The men thereupon raised their demands to 12,000,000 rubles, placed the five directors present under arrest and took them to the Ministry of Justice where they were detained until evening. Meanwhile, an influential member of the Council of Delegates, Gvosdeff, with much difficulty, induced the men to place their claims before the Central Board of Conciliation.

FOREIGN TRADE REPORTS. AUSTRALIA.

IMPORTS from the United States show a marked increase. For the fiscal year ended June 30, 1916, the value of manufactures of rubber was \$2,380,993. For the first quarters of 1916 and 1917 the values were \$61,245 and \$60,710, respectively.

During the fiscal years 1915 and 1916, the United States exported to New South Wales:

	1915.	1916.
Tires	\$214,189	\$1,618,703
Treads, etc.	6,940	7,946
Rubber boots and shoes	197,151	49,662
Gum and wading boots.....	10,195	19,892
Totals	\$338,475	\$1,696,203

The large increase in the sale of American cars and tires resulted from a personally conducted campaign, with Australian

supply depots managed by experienced Americans, and with extensive advertising in local newspapers and magazines; another factor was the difficulty of importing from Europe. According to "The Australian Motorist," the demand is for low-priced cars and the American manufacturers are getting the business. It is stated that there is not an American car in the Commonwealth costing more than \$2,554.

CEYLON.

Exports of rubber to the United States during the first quarter of 1917 were 6,968,047 pounds, valued at \$4,204,506.

SIAM.

(Vice Consul Carl C. Hansen, Bangkok.)

During the fiscal year ended March 31, 1916, 37 motor-cycles were landed at the port of Bangkok, against 25 for the previous year, and their declared value was \$7,730 and \$4,639, respectively. The imports of bicycles advanced from 1,196 machines, valued at \$19,872, in 1915 to 1,281 machines, valued at \$24,598, in 1916.

The value of the rubber-tire imports for motor-cycles and bicycles was \$9,590 for 1915 and \$14,551 for 1916. All of this trade is chiefly British.

The import duty on all kinds of cycles and parts, including rubber tires, is 3 per cent ad valorem.

SPAIN

The accompanying figures show the imports of rubber and its manufactures for the years 1915 and 1916:

	1915.		1916.	
	Metric Tons.	Value.	Metric Tons.	Value.
India rubber, gutta percha and substitutes	948	\$1,169,531	1,697	\$1,986,278
Unvulcanized rubber	8	981,305	578	2,030,837
Other manufactures of	389	866,305	484	889,507
Total	1,617	\$2,957,141	2,759	\$4,906,622

The chief countries of origin of tire imports during 1915 were:

United States.	France.	Great Britain.
\$21,337	\$407,865	\$172,551

SWEDEN.

Owing to the scarcity of rubber, Goteborg factories dependent upon rubber for raw material have been closed and practically all automobiles and taxicabs in the city and district have been put out of commission. The exportation from Sweden of parts of flying machines and airships, and also of air balloons and parts has been prohibited.

EXHIBITION OF TOYS, GAMES, SPORTING AND GYMNASTIC GOODS IN VENICE.

The organizing committee of the National Industrial Exhibition of toys, games, sporting outfits, and gymnastic apparatus, which is to be held in Venice next September, announces that although the exhibition is intended for Italian manufacturers, it is desired to display a few good productions of a similar nature manufactured by the Allied nations, in order that Italian manufacturers and the general public may have an opportunity of seeing what friendly nations have accomplished in these industries which before the war were extensively carried on in Germany.

RUBBER GOODS IN GREECE

Conditions brought about by the war are continually causing new markets to be opened for various products. Thus, whereas Austria and Germany formerly supplied Greece with three-fourths of the rubber goods needed there, they are now off the market, and the United States ought to be able to furnish them. American firms contemplating the establishment of business relations with Greece should remember the importance of having a commission agent there fully trusted and familiar with all local needs and customs, and above all, familiar with the language.

THE SITUATION IN THE DUTCH EAST INDIES.

By a Special Correspondent

THE shipping difficulties are causing the accumulation of large quantities of various products, including rubber. Naturally this condition is regarded with a certain amount of anxiety and the question has been raised whether it was advisable to build large warehouses for storing these goods. In view of the possibility of further shipping hindrances and of deterioration in the quality of the goods, due to climatic influence, the suggestion has gone forth to establish markets in America whence the products could be further distributed. This is urged as a more feasible plan, especially as even before the war large quantities were consigned to New York instead of to Holland.

RUBBER FACTORY IN BATAVIA.

Industries here are making great headway and the government is fortunately far-sighted enough to see the importance of supporting them. It has, therefore, liberally subsidized several companies carrying on operations in Java.

A rubber factory, running along the same lines as the one at Singapore, has been opened in the east end of Batavia. It covers an area of 1,500 square meters and has been equipped with the most up-to-date machinery. Rubber goods of many kinds previously supplied by Germany will be produced and orders have already been booked for a long time in advance.

CENTENARY OF THE BUITENZORG BOTANICAL GARDEN.

On May 18, 1817, a botanical garden was founded at Buitenzorg, which has not only developed into one of the greatest botanical institutions in the tropical world, but has become a center for the scientific study of the tropics in general.

After half a century of more or less retarded progress the garden suddenly began a more rapid development. It became a power in the economic position of the Dutch colonies in the East; new crops were introduced and seeds of those already known were more widely distributed. Expeditions were undertaken to discover what products of economic importance flourished in a wild state in these islands—several journeys having been made in search of lactiferous plants, for instance—and plants thus found were often cultivated.

Besides this, laboratories were erected, diseases studied and selections made. Soon, also, experiment stations were organized, demonstration fields were laid out for the benefit of the small landowner and agricultural instruction was given through investigations in the laboratory concerning the crops, especially those cultivated by the natives. When the questions with which the institution occupied itself encroached more and more on purely economic ground, the Department of Agriculture was founded, to which was added at a later period a section for Industries and Commerce.

It had been planned to celebrate the centenary of this unique establishment with due solemnity, but present conditions have made it necessary to postpone festivities until after the war.

GOVERNMENT RUBBER PLANTATION TO BE SOLD.

In connection with the government's decision to offer the state rubber plantation at Langsar, Sumatra, at public sale, it has been proposed to announce the sale at so early a date and to make such arrangements for inspecting the estate as to enable prospective buyers in Europe and America to communicate with their representatives here. Considering the present difficulties of communication, it cannot be said that the government has chosen a very favorable time for the sale.

RUBBER CULTIVATION IN TAPANOELI, SUMATRA.

Until quite recently the residency, Tapanoeli, on the west coast of northern Sumatra, did not boast a single European planting enterprise. Now, however, there are several flourishing plantations, new ones are being constantly opened up and the whole

residency is practically overrun by surveyors and prospectors.

Rubber is the chief product, and of the three principal companies, the Sumatra Caoutchouc Plantage Maatschappij is the most important, having five estates of which the largest, Batang Toroe, is the finest in all Tapanoeli. The factory is worked by steam. There is an up-to-date central hospital with separate wards for infectious diseases and directed by a European doctor. Both here and on another of the company's estates are comfortable clubs much frequented by neighboring planters.

The Rotterdam Tapanoeli Cultuur Maatschappij began with a capital of 2,000,000 gilders [\$800,000]. In 1915, the production of rubber from this estate was 313,027 pounds. Here, too, there is a club, a good hospital and a motion picture theater. The factory is run by electricity and, like all other buildings and houses on the estate, is electrically lighted.

Almost all companies employ contract coolies from Java, and medical aid, hospitals and proper sanitation are amply provided. The various planters have formed an association which works for the general good of the district.

The center of all this is the little town of Batang Toroe, whence the rubber and other products of the neighborhood are forwarded by automobile trucks to the seaport, Sibolga, for export. There is also a government automobile service running between the port and Padang Sidempoean, which touches Batang Toroe, and there are very definite plans for connecting the latter place with Sibolga by rail. All indications point towards the future importance of Batang Toroe and to the significance of Tapanoeli as a rubber-producing country.

NATIVE PLANTATIONS.

Urged by the government to develop the cultivation of rubber, the natives of Djambi and Palembang, Sumatra, began planting rubber trees with more zeal than knowledge. Consequently, the native holdings are generally miserable sights. Trees having a girth of barely 15 cm. at a height of one meter are tapped with appalling frequency. At present native rubber sells from 15 to 20 per cent below European rubber and there is reason to expect that unless something is done in time, this difference will increase. It appears that steps are being taken to remedy the condition by appointing European inspectors and instructors, but it is feared that by the time such corrective measures will have actually been put in practice it will be too late. Meanwhile, about 4,000,000 trees have been planted by natives in Palembang, and according to authorities, 50 per cent may, with proper care, reach the bearing stage and for years to come will yield about two pounds of rubber per tree.

RUBBER IN EAST JAVA

The cultivation of *Hevea* is progressing steadily and trees are rapidly coming into bearing condition. The following figures obtained from one estate illustrate this: The area of the estate is 25,000 acres; at the beginning of 1915, a yield of 1,557,317 pounds of rubber was obtained from 435,039 trees and at the end of 1916, the production from 964,045 trees was 3,375,147 pounds. For both years the average per tree was about 3½ pounds.

According to reports from Wlingi, abnormally heavy rainfalls are interfering with tapping and much anxiety is felt concerning the rubber yield.

RUBBER COMPANIES.

The fusion of five rubber companies is announced, namely, the Bajan Sumatra Rubber Co., the Langsar Sumatra Rubber Co., the Plantation Co. Dolok Marangir, the Rotterdam Langkat Rubber Co., and the Rotterdam Deli Hevea, Limited. The new company thus formed is known as the N. V. Vereenigde Indische Cultuur Ondernemingen, and has a capital of 10,000,000 florins [\$4,000,000].

The Lampong Sumatra Rubber Co., lately founded and having a capital of 900,000 florins [\$360,000], has taken possession of all the property of the N. V. Lampong Caoutchouc Co.

The issued capital of the Bandar Sumatra Rubber Co. has been increased by 500,000 florins [\$200,000], so that at present it amounts to 1,100,000 florins [\$640,000]. The authorized capital, 2,500,000 florins, [\$1,000,000], remains unchanged.

The Amsterdam Java Rubber Co. has reduced its authorized capital to 300,000 florins [\$120,000], while 300,000 florins new capital has been issued.

A NEW DUTCH TRANS-PACIFIC STEAMSHIP LINE.

Two large Dutch steamship companies, the Netherlands Royal Mail Line and the Rotterdam Lloyd, have combined to run a semi-monthly passenger and cargo service from Batavia to San Francisco with Singapore, Hong Kong, Nagasaki, Yokohama and Honolulu as ports of call. The vessels to be employed, which number eight, are large ocean-going steamers, most of which have hitherto been running between Batavia and Rotterdam, *via* Suez, and they will make the trip from Yokohama to San Francisco in about 17 days.



TAPPING ON ONE OF THE SUMATRA PLANTATIONS OF THE GENERAL RUBBER CO.

It appears that for some time at least there is little likelihood of cargo being accepted from Japan, as all available space will have been booked in Java and Singapore. The rate from Japan to Java will be 22 yen* per ton. Cargo from Yokohama has hitherto been transhipped at Kobé, and thus costs 3 yen more (or 25 yen in all) per ton than cargo from Kobé. The rate by the Japanese subsidized lines is about 14 yen per ton.

DUTCH PLANTATION COMPANIES INCREASE CAPITAL.

Two companies in Dutch East Indies have recently increased their capital. The Javasche Cultuur Maatschappij to 5,000,000 florins; the Nederlandsche Gutta Percha Maatschappij is offering its shareholders the opportunity of subscribing for additional shares to the amount of 300,000 florins, and the Amsterdam-Tapanoeli Rubber Cultuur has under consideration the doubling of its capital to 2,000,000 florins.

PRODUCTION OF GUTTA HANGKANG.

The latest statistics for Gutta Hangkang show that the production for the year 1916 amounted to 2,296 tons, as against 2,466 tons in 1915 and 1,905 tons in 1914.

This product is obtained exclusively in Borneo and is exported chiefly to Singapore where the bulk is purchased by America.

JAPANESE, CHINESE AND GERMAN BANKS

The "Indische Mercuur" questions whether those banks which have continually increased their capital will be able to invest large sums profitably after the war. The fact that Japanese merchants are settling more and more, and that the position of the Japanese and Chinese banks will consequently be strengthened,

is regarded with some apprehension. Moreover, there is a large German population that desires to have its own bank, and rumors are already heard that the Deutsch-Ost-Asiatische bank intends to establish one or more branches.

THE 1916 RUBBER PRODUCTION IN THE DUTCH EAST INDIES.

It appears from the statistics compiled by "Netherland-India News" that the direct exports of plantation rubber from the Netherland-Indies amounted to 15,121 tons during the first half of the year 1916, as follows:

Java	tons	5,498
Re-shipments		622
		6,120
Outside districts		9,001
Total		15,121

The 622 tons from other localities, which were sent to Java for re-shipment to foreign countries, were primarily destined for the Batavia market, and originated for the larger part from Tapanoeli (221 tons), Lampongs (194) and West Borneo (76).

The total product of the Netherlands-Indies for the year 1915 was only 20,100 tons.

THE SITUATION IN MALAYA.

By a Special Correspondent.

MALAYAN COMMERCE.

VIEWED as a whole, business during 1916 was distinctly satisfactory. Money is plentiful and no failures of importance have been recorded. Figures show an all-round increase, though in the case of imports, the actual volume of trade was less than in pre-war times. Importations from Japan, however, have been growing rapidly, while the fact that the export trade—chiefly rubber and tin—with America *via* the Pacific Ocean, is undergoing an equal degree of development, is admirably illustrated by the following figures:

	Tons.			
	1913.	1914.	1915.	1916.
	2,800	3,800	13,000	15,200

Shipping difficulties are causing a great deal of anxiety, and it is feared that if conditions continue getting worse, the trade record for 1917 will fall greatly below that for the past year. At Penang, the arrivals and gross tonnage for 1915 and 1916 were:

	Ships Entered at Port.	Gross Tonnage.
1915.....	2,284	2,813,061
1916.....	2,209	2,577,020
Decrease	75	236,041

In spite of this condition, shipments of rubber were larger than ever. Singapore noted an increase of 60 per cent over the previous year, while from Penang exports of rubber for 1916 were 17,850 tons as compared with 14,738 tons during 1915—a difference of 3,112 tons. Prices for rubber were considered satisfactory. In the Federated Malay States, 2s. 1½d. was the lowest price obtained for Smoked sheet; at Penang, First latex brought prices ranging from 3s. 8½d. to 2s. 2½d. per pound.

The motor trade, which experienced a setback during 1914 and 1915, is recovering rapidly, due to the prosperity of planters and miners, who can take advantage of the fine roads through magnificent tropical scenery. The wealthier Chinese, however, are the best customers, since they are rarely satisfied with one car when once they take to motoring. It also seems likely that there will be a big demand for motor tractors in the near future.

The following figures show that the larger part of the supply comes from the United States, although in 1914 the United Kingdom leads:

	1913. £ Sterling.	1914. £ Sterling.	1915. £ Sterling.
United States	149,503	65,884	52,073
United Kingdom	133,709	88,429	29,521
Belgium	5,086	834	...
Germany	4,831	1,852	...
France	1,644	858	1,338
Italy	1,283	1,864	1,050

The total imports of cycles, automobiles and accessories at Straits Settlements ports were as follows:

	£ Sterling.
1913	323,824
1914	169,301
1915	93,622
1916 (nine months)	260,983

For the Federated Malay States the values were £129,816 and £44,060 in 1914 and 1915, respectively.

BANGKOK TO SINGAPORE BY RAIL.

Thanks to the energies of the general manager of the F. M. S. Railways, the Bangkok-Penang line has been completed, and it is now possible to travel from Bangkok, Penang and Kuala Lumpur to Singapore by rail. The construction of this new



SPECIAL TRAIN PASSING THE MARBIE HILL NEAR IPOH, PERAK, FEDERATED MALAY STATES.

line will undoubtedly play a great part in the development of the rich kingdom of Siam, and the Malay Peninsula may confidently look forward to a share of the benefits flowing therefrom. Penang, as the only deep-water outlet on the west coast of the peninsula, from Burma down, is certain to gain in importance.

INDIAN LABOR.

In a previous letter, mention was made of the existing difficulties in connection with the labor question. It can, therefore, be imagined that the news that the Madras Government had ruled that from April 1, 1917, immigration to the Federated Malay States would be limited to the lowest possible minimum, was received with anything but pleasure. It is hoped, however, that some arrangement will be made whereby the difficulties, thus augmented, may be diminished.

THE MALAY HOLDING.

Attention has lately been called to the hidden danger in the Malay holding. Malays are incorrigible fatalists; therefore, if their estates are attacked by some kind of pest or disease, and the most primitive methods fail to produce improvement, they calmly allow the destruction to go on, resignedly declaring it to be the will of God. Consequently it is feared that if things are allowed to continue in this way, pests and diseases which, strangely enough, do not do so much damage to small plantations as to larger ones, will spread from these small Malay estates to the European holdings in the form of practically unconquerable epidemics. Proposals have gone forth to put the matter before the government and urge that a staff of efficient inspectors be organized whose duty it will be to inspect the Malay estates at certain intervals and deal drastically with any cases of disease or pest they may find.

A fire occurred on Malacca Rubber Plantations, Serkam

Estate, on March 29, early in the morning, causing considerable damage to the dry rubber factory. Fortunately there was no wind blowing and the offices and store close by escaped.

SINGAPORE EXPORT DUTIES HAMPER JAPANESE RUBBER INDUSTRY.

According to the "Far Eastern Review," the export duties on Straits rubber shipped through Singapore are likely to prove a heavy blow to Japanese manufacturers. Many factories have already suspended work temporarily because of the situation. Japan's rubber goods industries have been expanding rapidly of late and last year's imports of crude rubber up to November 30 at Yokohama amounted to 2,879,000 yen, as compared to 1,232,000 yen in 1913, rubber to the value of 2,109,000 yen, or 73 per cent coming from Singapore. Of the nation's demand, 9,000,000 yen worth is supplied by domestic goods, while imported articles amount to only about 800,000 yen.

BRAZILIAN NOTES.

MAY 13 was the anniversary of the day upon which the bill for the emancipation of slaves became law. From various parts of the country came reports of more or less brilliant festivities in honor of the occasion.

THE STEVEDORES' STRIKE.

For several days shipping activities at Para were interfered with owing to a strike of the stevedores. Of the many vessels held up at the port, were some waiting to be freighted with rubber for New York and Liverpool. Fortunately this state of affairs was soon brought to an end, thanks to the efforts of the governor, Dr. Lauro Sodré, who worked hard to bring about an understanding between the strikers and the shipping companies. The Lloyd Brasileiro, the Booth S. S. Co. and the Empresa Port of Para were among the companies affected.

A feature of the strike was that the conductors, motormen and chauffeurs threw up their work in sympathy with the stevedores.

RUBBER TRADE CONDITIONS.

Trade during 1916 was very profitable in the states of Amazonas and Maranhao, in the former owing to the high prices ruling in the rubber market. The fall in Brazilian exchange also benefited the exporting centers, Manaus and Maranhao. In spite of this, representative men are of opinion that the prosperity here is purely artificial and that the future is very uncertain. The British vice-consul at Manaus goes so far as to advise British export firms to refrain from extending large or lengthy credits. This is not without significance seeing that the greater part of the exports has up to now been financed by means of letters of credit issued by London bankers and merchants, although considerable amounts have been drawn for on New York in United States currency.

The fact that the output of rubber and caucho ball has remained stationary for some years while the Eastern production has not only increased by leaps and bounds, but has attained a perfection of quality comparable if not surpassing the best Brazilian rubber, is causing uneasiness even among the most optimistic. More scientific methods and the encouragement of planters and *seringueiros* are constantly urged.

The imports of rubber goods, including tires, show an enormous increase in favor of the United States, being 784 per cent in quantity and 554 per cent in f. o. b. value. The increase in quantity, 468,526 kilos, compared with the falling off of 456,720 kilos from Germany, shows that America has successfully replaced the former country in the favor of Brazil.

United Kingdom exports fell off 12.8 per cent in quantity.

Consul George H. Pickerell, at Para, reports that the total exports of crude rubber from Para and Manaus during May,

1917, amounted to 9,219,605 pounds compared with 7,314,826 pounds for the same month in 1916. Shipments to the United States aggregated 7,690,816 pounds and to Europe 1,528,789 pounds, compared with 5,884,222 and 1,430,604 pounds, respectively, last year. There were no shipments from Itacoatira, Brazil.

The several grades of rubber exported are shown in the following table:

Grade.	From Para.		From Manaus.	
	To United States.	To Europe.	To United States.	To Europe.
Fine pounds	1,710,727	565,905	570,082	315,042
Medium	194,820	14,375	125,970	148,587
Coarse	1,220,651	27,118	350,625	13,081
Caucho	2,321,412	136,964	1,196,529	307,717
Totals	5,447,610	744,362	2,243,206	784,427

THE TIRE TRADE OF ARGENTINA.

As a measure to prevent German resumption of the tire supply of Argentina after the war "The Commercial Motor" points out that the *Germans own extensive rubber estates in Para, Brazil, and that it would be to the advantage of British manufacturers to control their sources of rubber supply in a similar manner. While about 75 per cent of the automobiles are of British manufacture and Dunlop and North British tires were well represented, the German Continental tire people were gradually getting the bulk of the trade.

Road conditions in Argentina are improving under the able directorship of British managers of the Argentine railways, many of which have formed a road board and are setting aside regularly 3 per cent of their gross earnings for the improvement and maintenance of the main roads and byways linking the up-country farms with the principal railway depots. Responding to this stimulus, the future trade in pleasure and commercial motor vehicles and accessories of every sort promises to be brisk. It has been predicted that a large measure of South American development will be due to heavy motor lorries, and already there is beginning to be a field for the sturdiest 3 and 5-ton American trucks, our lighter commercial vehicles having failed to stand up under the necessarily hard usage. The dispatch, during the past four years, of no fewer than six American commissions to Argentina, indicates that manufacturers in the United States are not altogether neglecting their trade opportunities with sister republics of the western hemisphere.

BRITISH HONDURAS INCREASES CHICLE EXPORT TAX.

By an ordinance in effect June 16, 1917, the duty on chicle exported from British Honduras is increased from ½ cent to 1½ cents per pound. Statistics for the exports during 1916 have not yet been published in Honduras, but in 1915 there was exported 3,467,696 pounds of chicle gum, valued at \$1,231,655. The imports of chicle gum from British Honduras into the United States during the fiscal year 1916 amounted to 712,288 pounds, valued at \$248,067, while the imports from Canada, which also originate in British Honduras, amounted in the same year to 2,152,933 pounds, valued at \$1,214,963.

RUBBER GOODS IN THE DOMINICAN REPUBLIC.

The total imports of rubber and rubber manufactures of the Dominican Republic amounted to \$58,547 for the year 1916 as compared to \$34,676 for the year 1915. This substantial increase of \$23,871 indicates a growing use of rubber goods in the island republic. Of the 1916 total, goods to the value of \$56,752 came from the United States. Porto Rico was the next largest source, its business amounting to \$1,668.

*Our esteemed contemporary is surely misinformed in this particular.—THE EDITOR.

Recent Patents Relating to Rubber.

THE UNITED STATES.

ISSUED JUNE 19, 1917.

- N** O. 1,230,181. Vehicle support. H. G. Coates, Elmira, N. Y.
 1,230,182. Inflating device comprising both hard and soft rubber sections. J. J. Connell, Detroit, Mich.
 1,230,284. Dental rubber dam holder and cutter. O. B. Elkins and M. S. Smith, assignors of one-fourth to N. Statham—all of Abbeville, Ga.
 1,230,290. Life preserver comprising an inflating gas container. B. A. Geiger, Chicago, Ill.
 1,230,333. Laminated, cohesive, interwound, bonded fabric for tires. L. A. Subers, East Cleveland, Ohio.
 1,230,508. Non-skid device for vehicle tires, comprising a rubber stud. J. E. Peden, New York City, assignor of one-half to T. F. Smith, St. Paul, Minn.
 1,230,518. Manufacture of brushes the bristles of which are held by vulcanized rubber. E. E. Robinson, Belleville, N. J., assignor to Hanlon & Goodman Co., New York City.
 1,230,543. Means for expanding and contracting demountable rims. J. H. Wagenhorst, Akron, Ohio.
 1,230,589. Pencil and pen holder having rubber plugs. J. J. Macnoriux, Kenosha, Wis.
 1,230,606. Quick detachable hose coupling. W. McQuigg Saunders, Evansville, Ind.
 1,230,616. Rim and wheel for solid rubber tires. A. C. Stevenson, Scotstoun, Glasgow, Scotland.
 1,230,650. Abdominal belt. F. G. Baugatz, Paris, France.
 1,230,683. Elastic finger cot for cleaning teeth. J. A. Daly, New Rochelle, N. Y.
 1,230,690. Pneumatic cushion. A. C. Eggers, Brooklyn, N. Y., assignor to The Goodyear's India Rubber Glove Manufacturing Co., Naugatuck, Conn.

ISSUED JUNE 26, 1917.

- 1,230,854. Hose coupling. E. F. J. Breuer, Decatur, Ill.
 1,230,858. Gas cartridge apparatus for inflating life-preserving belts. W. G. Brokaw, Paris, France.
 1,230,902. Tire fastening device. F. P. Johnson, Danville, Pa.
 1,230,967. Manufacture of block tires. C. B. Whittelsey, assignor to The Hartford Rubber Works Co.—both of Hartford, Conn.
 1,231,025. Self-supporting garment comprising an elastic belt. G. Inghram, Fairview, W. Va.
 1,231,141. Fabric for printers' blankets and other purposes. F. E. Ellis, Revere, Mass.
 1,231,142. Packing for printing presses. F. E. Ellis, Revere, Mass.
 1,231,166. Milking machine teat cup. H. R. Jenkins, Egham, New Zealand.
 1,231,256. Fountain pen. M. E. Heilbrun, New York City.
 1,231,296. Resilient heel formed with a suction cup. A. F. Priest, Oak Park, Ill.
 1,231,299. Cushion heel for boots and shoes. M. Rieckmann, Springfield, Mass.
 1,231,314. Vehicle wheel rim. J. H. Wagenhorst, Akron, Ohio, assignor of one-fifth to The B. F. Goodrich Co., New York City, one-fifth to The Goodyear Tire & Rubber Co., Akron, Ohio, and one-fifth to The United States Tire Co., New York City.
 1,231,332. Ankle support and protector. H. J. Collis, Taunton, Mass.
 1,231,446. Tire head. W. C. Stevens, assignor to The Firestone Tire & Rubber Co.—both of Akron, Ohio.
 1,231,505. Hand stamp. W. J. Denney, assignor of one-half to W. E. Boyer, both of Malone, N. Y.
 1,231,530. Valve ball. F. T. Roberts, assignor to The Paramount Rubber Co.—both of Cleveland, Ohio.
 1,231,538. Vehicle wheel rim. J. H. Wagenhorst, Akron, Ohio.
 1,231,539. Vehicle wheel rim. J. H. Wagenhorst, Akron, Ohio, assignor of two-fifths to The B. F. Goodrich Co., New York City, one-fifth to The Goodyear Tire & Rubber Co., Akron, Ohio, and one-fifth to The United States Tire Co., New York City.
 1,231,548. Tire valve. E. V. Myers, East Orange, N. J., assignor to A. Schader's Son, Inc., Brooklyn, N. Y.

ISSUED JULY 3, 1917.

- 1,231,568. Electric cable. L. Clark, Englewood, N. J.
 1,231,612. Pneumatic tire. O. P. Hoyt, Monroe, N. Y.
 1,231,644. Demountable rim. M. F. Patton, Tuscaloosa, Ala.
 1,231,748. Teat cup. H. A. Kricke, Crows Landing, Calif.
 1,231,777. Cushion pneumatic heel. O. Mussinan, New York City.
 1,231,780. Auto wheel having a rim in four sections, each with a solid rubber tire. J. G. Oehler, St. Louis, Mo.
 1,231,931. Cushion tire. I. Normandy, St. Catharines, Ontario, Canada.
 1,231,957. A pneumatic automobile tire. J. C. Smith, assignor of twenty-four one-hundredths to C. W. Head and twenty-five one-hundredths to B. Garcia—all of Mobile, Ala.
 1,231,999. Door stop. F. H. Chase, assignor of one-half to J. W. Talbot—both of Chicago, Ill.

- 1,232,057. Inflatable arm rest for crutches. A. G. Lineback, Falls City, assignor of one-fourth to J. R. Chambers, one-fourth to Ida Davenport and one-fourth to Sarah Lineback, Albany—all in Oregon.
 1,232,075. Flexible brush comprising a rubber strip. E. B. Oates, Paterson, N. J.
 1,232,100. Pneumatic tire. O. Schutz, New York City.
 1,232,272. Inflation valve cap. C. Frazier and J. Ashmore—both of Biggs, Ill.
 1,232,277. Waterproof hat protector. I. Glaser, Washington, D. C.
 1,232,292. Rim tool. C. H. Guiles, Addison, N. Y.
 1,232,306. Means for securing in place and rendering useful deflated pneumatic tires. W. H. Heron, Washington, D. C.
 1,232,406. Vehicle tire. C. W. Stewart, Martinsburg, W. Va.

ISSUED JULY 10, 1917.

- 1,232,509. Reinforced rubber sole. O. C. Davis, Brockton, Massachusetts.
 1,232,518. Rubber heel. E. J. Emery, Portsmouth, N. H.
 1,232,592. Tire valve. T. W. Morris, assignor of one-half to G. B. Dryden—both of Chicago, Ill.
 1,232,726. Pneumatic tire valve. S. C. Sladden, New York City.
 1,232,790. Heel. I. Gilbert, Chicago, Ill.
 1,232,887. Filler for tires. R. B. Bostwick, Cleveland, Ohio.
 1,232,906. Resilient tire. A. M. Ferguson, Rochester, N. Y., assignor to W. Keyel, Penfield, N. Y.
 1,232,981. Emergency rim. H. C. Sampson, San Francisco, and A. F. Farman, Oakland—both in Calif.
 1,233,051. Rubber bumper. P. H. Gundermann, Chicago, Ill.
 1,233,143. Cushion tire. A. Teresa, assignor of one-third to M. Prieto and one-third to M. Goizueta—all of Habana, Cuba.
 1,233,160. Combined life preserver and diving suit. C. S. Altoonian, Providence, R. I.
 1,233,277. Tire. O. A. Kottemann, St. Louis, Mo., assignor of forty-nine one-hundredths to E. A. Holz, C. L. Case, J. C. Holz and J. H. Jones.
 1,233,278. Tire. D. A. Messner, assignor of one-third to S. A. Messner—both of Akron, Ohio.
 1,233,279. Tire. D. A. Messner, assignor of one-third to S. A. Messner—both of Akron, Ohio.
 1,233,283. Vehicle-wheel rim. J. H. Wagenhorst, Akron, Ohio, assignor of one-fifth to The Goodyear Tire & Rubber Co., a corporation of Ohio, one-fifth to The United States Tire Co., and two-fifths to The B. F. Goodrich Co.—both corporations of New York.

THE UNITED KINGDOM.

ISSUED JUNE 6, 1917.

- 105,385. Rubber galvanic batteries. C. C. Rattey, "Logan," Seagry Road, Wanstead, Essex.
 105,412. Ply boards or sheets comprising wood veneers and waterproof fabric. S. F. Saunders, White Horse, East Coates, Isle of Wight.
 105,424. Tire tool. A. A. Friestedt, 2934 West Lake street, Chicago, Illinois, U. S. A.
 105,441. Convertible military garment and tent. E. I. Brown, 591a Yonge street, Toronto, Ontario, Canada.
 105,459. Rubber-covered vacuum-flask stoppers. F. E. and G. Harris, 46 Sydney street, Stoke Newington, London.
 105,473. Game comprising an apparatus with rubber base. J. H. Adams, Rotton Park Road, Edgbaston, Birmingham.

ISSUED JUNE 13, 1917.

- 105,512. Corset having a section of elastic material. D. Kops, 525 West End avenue, Manhattan, New York, U. S. A.
 105,537. Wheel comprising a solid tread member and a number of pneumatic tubes. G. S. Gallagher, 672 St. Nicholas avenue, Manhattan, New York, U. S. A.
 105,577. Seamless hot water bottle. F. C. Jones, 24 Belvedere Road, Upper Norwood, Surrey.
 105,684. Detachable rim. H. F. Cox and M. V. Powell, 333 West Ninth street, Flint, and V. F. Brown, North Lincoln avenue, Bay—both in Michigan, U. S. A.

ISSUED JUNE 20, 1917.

- 105,733. Repairing rubber soles and heels. W. Jackson, Patent Fibre Co., of Singapore, Straits Settlements.
 105,735. Hot water bottle. F. C. Jones, 24 Belvedere Road, Upper Norwood, Surrey.
 105,741. Cover for pneumatic tire, comprising tread blocks. C. Jordan, 168 Homeward avenue, Pittsburgh, Pennsylvania, U. S. A.
 105,796. Tire casing comprised of rawhide, gutta percha coated, layers of rubber and balata impregnated canvas. A. A. Crozier, 3 Woodquest avenue, Herne Hill, London.

- 105,843. Helmet comprising rubber tubes. A. F. Bargate, 20 Lawrence Lane, London.
- 105,866. Non-slip bath mat. W. H. E. Clarke, 6102 Market street, Philadelphia, Pennsylvania, U. S. A.

THE DOMINION OF CANADA.

ISSUED MARCH 31, 1917.

- 175,445. Brassiere having an elastic section. B. and H. Prince both of New York, New York, U. S. A.
- 175,467. Hose coupling comprising fabric hose sections. N. B. Braly, Butte, Montana, U. S. A.
- 175,485. Cord tire. F. S. Dickinson, New York, New York, U. S. A.
- 175,507. Corset comprising an elastic section. D. Kaps, New York, New York, U. S. A.
- 175,581. A tire having an outer and an inner section made of tough flexible material, and an intermediate section of soft rubber. The Pearce-Arrow Tire & Rubber Manufacturing Co., assignee of A. L. Pearce both of Philadelphia, Pennsylvania, U. S. A.
- 175,604. Heel pad for boots and shoes. J. A. Adams, assignor, Toronto, and E. A. Adams, assignee of all the title, Montreal, Quebec.
- 175,613. Tire protector. W. E. Wilson and S. S. Wilson both of Des Moines, Iowa, U. S. A.
- 175,629. Life preserver. W. Bruce, Walla Walla, Washington, U. S. A.
- 175,631. A container for a stack of tires. W. R. Busenbark, Akron, Ohio, U. S. A.
- 175,648. Tire shoe. J. C. Fickes, Steubenville, Ohio, U. S. A.
- 175,666. Truss comprising a rubber pad. D. McKay, Collingwood, Ontario.
- 175,679. Air cooled pneumatic tire. I. Normandy, St. Catharines, Ontario.
- 175,688. Block tire. C. A. Simons, Albany, New York, U. S. A.
- 175,758. Pneumatic tire pressure gage. C. Harrison and K. Lamond—both of Vancouver, British Columbia.
- 175,853. Pneumatic tire armor. J. I. Kent, Dundas, Ontario.
- 175,966. Catamemal support. W. K. Lyall, Montreal.
- 175,987. Tennis ball. F. W. Stockton, Chicago, Illinois, U. S. A.

NEW ZEALAND.

ISSUED MAY 17, 1917.

- 37,416. Milking machine teat cup. J. A. Mawston, Pine Grove Farm, Waerenga Valley, Waikato.

THE FRENCH REPUBLIC.

PATENTS ISSUED (WITH DATES OF APPLICATION.)

- 482,764 (August 20, 1916). Flexible metal bands for rubber wheel tires. De Naxailles-Labatut.
- 482,746 (July 21, 1916). Wheel with removable crown having rubber tire. Cox, Powell & Brown.
- 482,770 (September 2, 1916). Improvements in elastic wheels. W. E. Superman.
- 482,797 (September 6, 1916). Pneumatic tires for cycles, automobiles, etc. P. Harder.
- 482,805 (September 6, 1916). Improvements in inflating valves of pneumatic and similar tires. H. S. Land.
- 482,861 (March 22, 1916). Utilization of old pneumatic tires for making soles of boots, shoes, etc. U. Chaudesson.
- 482,903 (September 18, 1916). Elastic tire for carriage wheels, G. Kanter.
- 482,919 (September 20, 1916). Tire device for wheels of automobiles and other vehicles. R. Blakoe.

TRADE-MARKS.

THE UNITED STATES.

- 103,173. The compound word ON-THE-HEEL rubber heels. E. S. Helwitz, Brooklyn, N. Y.
- 103,263. The compound word Ox-HEART over a representation of leaves and fruit—chewing gum. D. D. Long, Oswego, N. Y.
- 103,317. The words ONE HOCKEY rubber tires for automobiles. W. B. Buckley, New York City.
- 103,378. The word ARMYMENT—chewing gum. The Armyment Co., Cincinnati, Ohio.
- 103,572. The word C. B. S. C. enclosed within a shield design—chewing gum. C. B. Shane Co., Chicago, Ill.
- 97,448. The word WEAREVER—rubber sponges. The Faultless Rubber Co., Ashland, Ohio.
- 102,362. The word FORMALITH—pacifiers. J. Schmid, Inc., New York City.
- 102,686. The letter M within a shield design—ice caps, water bottles, combination water bottles and fountain syringes, invalid cushions, rubber urinals, and fountain syringes. The Mechanical Rubber Co., New York City, Chicago, Ill., and Cleveland, Ohio.
- 103,977. The number 1 within a cone-shaped design—chewing gum. Common Sense Gum Co., New York City.
- 103,478. The number 5 within a cone-shaped design—chewing gum. Common Sense Gum Co., New York City.
- 100,940. The compound word MERRA above a monogram design—rubber and fabric hose, rubber belting, rubber packing. Southern Railway Supply & Equipment Co., St. Louis, Mo.

- 101,336. Representation of a flying duck within a rubber tire—tire fabric, canvas, sail cloth, tent cloth, cotton bagging. Katama Mills, Boston, Mass.
- 101,839. The word THERMOID—tires, hose and mechanical rubber goods. Thermoid Rubber Co., Hamilton township, Mercer County, N. J.
- 102,406. A representation of a tire—boots and shoes made of rubber and canvas. Converse Rubber Shoe Co., Malden, Mass.
- 85,769. The word HIDALGO—rubber. Acushnet Process Co., New Bedford, Mass.
- 101,920. The word APEX in a triangular-shaped design—rubber boots and shoes. Goodyear Rubber Co., Middletown, Conn.
- 103,148. The word ITSAGO—sheet packing, piston packing and gaskets composed of or containing rubber. La Favorite Rubber Manufacturing Co., Paterson, N. J.
- 104,297. The words STORM HERO—waterproof outer clothing. B. Fligel, New York City.

THE UNITED KINGDOM.

ISSUED JUNE 6, 1917.

- 376,886. Representation of a life preserver with the words TRADE MARK on it and the word DICKEBALATA in the center—boots and shoes made with balata soles. R. & J. Dick, Limited, 3 McPhail street, Greenhead, Glasgow.
- 377,625. The word KORTIT—all goods included in class 40. D. Moseley & Sons, Limited, Chapel Field Works, Chapel Field Lane, Ardwick, Manchester.
- 374,551. The letters N B R C LD at the top of and the word EDINBURGH beneath a representation of plaid draperies, surrounding a shield on which is a design consisting of a sword and scales. The North British Rubber Co., Limited, Castle Mills, Fountainbridge, Edinburgh, Scotland.
- 377,263. Representation of a railroad train—goods manufactured from india rubber and gutta percha, not included in other classes but not including elastic fabrics and not including any goods of a like kind to elastic fabrics. Noorhai Jivaji, 435 and 437 Bhendy Bazar, Bombay, India.
- 377,082. The word RUSSAM within a diamond-shaped design—reclaimed india rubber and similar substances. Stead-Hunt, Limited, Fielding Mills, Fielding street, Middleton, near Manchester.
- 377,244. The word GEM—machines for treating crude and partly prepared india rubber. Summerscales, Limited, Phoenix Foundry, Royd Lane, Beechcliffe, and Coney Lane Works, Coney Lane—both in Keighley, Yorkshire.
- 376,332. The word MULTICO—all goods included in class 40. Standard Woven Fabric Co., South street, Walpole, Norfolk County, Massachusetts, U. S. A.
- 376,978. The word HAGIDE—india rubber sheeting. T. F. Atkinson, 43 Esme Road, Sparkhill, Birmingham.
- 378,079. The word FENWAY—goods manufactured from india rubber and gutta percha. United Drug Co., 43 Leon street, Boston, Massachusetts, U. S. A.

THE DOMINION OF CANADA.

- 22,415. The word ORIOLE—erasers. S. B. Beare, Limited, Toronto, Ontario.
- 22,438. The words SMILES AT MILES—rubber tires, inner tubes, valve patches, inner cases and rubber tubing of all descriptions. Lee Tire & Rubber Co., Whitmarsh, County of Montgomery, Pennsylvania, U. S. A.

NEW ZEALAND.

- 13,774. The word GOODYEAR divided by a representation of a winged foot—rubber hose. The Goodyear Tire & Rubber Co., Akron, Ohio, U. S. A.

DESIGNS FOR TIRES.

THE UNITED STATES.

- 50,931. Tire tread. Term 14 years. Patented June 19, 1917. F. B. Carlisle, North Kingston, R. I., assignor to J. M. Gilbert, New York City.
- 50,956. Pneumatic tire. Term 14 years. Patented June 19, 1917. R. M. Pierson, Akron, Ohio, assignor to The B. F. Goodrich Co., New York City.
- 50,961. Tire tread. Term 14 years. Patented June 19, 1917. L. T. Vance, assignor to Racine Rubber Co.—both of Racine, Wisconsin.



- 50,931 50,956 50,961 50,976 50,977 51,013
- 50,976. Pneumatic tire. Term 14 years. Patented June 26, 1917. R. M. Pierson, Akron, Ohio, assignor to The B. F. Goodrich Co., New York City.
- 50,977. Pneumatic tire. Term 14 years. Patented June 26, 1917. R. M. Pierson, Akron, Ohio, assignor to The B. F. Goodrich Co., New York City.
- 51,013. Tire tread. Term 14 years. Patented July 10, 1917. F. T. Faircloth, San Francisco, Calif.

Review of the Crude Rubber Market.

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NEW YORK.

THE crude rubber market has been dull in a general way throughout the entire month; however, in some quarters a fairly active business was reported. This fairly reflects the condition of the rubber mills, many of which are running night and day on war orders, while others have slowed down for repairs and inventories usual at this time. As a whole, the rubber industry is unusually busy, with government business as the prime mover.

The interest of manufacturers was almost entirely confined to inquiries for the various positions in 1918 and the actual volume of business transacted in futures was undoubtedly small. The fact is, producers are not at all anxious to quote or sell futures, due to the difficulties that encompass shipping and the uncertainties of ocean freight rates. There are, moreover, other reasons; for instance, producers are confronted with war taxes that will be increased and to what extent no one knows, as the war pressure grows heavier. Overhead costs, price of exchange, packing and handling charges may also be augmented through unforeseen circumstances and the burden will fall on the producer who would be forced to fill his "future" contracts at a loss.

Prices for spot plantation grades were steady and small price changes recorded during the early part of the month, when later, following the upward swing in London, the local market became firmer and prices advanced.

On July 5 First latex crêpe and Smoked sheet ribbed was 67 cents for spot and nearby. October-December, 66 cents; January-June, 65½ cents, and January-December, 65 cents. Brazilian sorts were devoid of interest, Upriver fine being quoted 69 cents. The tendency of the market was downward as the month progressed and with minor fluctuations obeying dominant London, prices were practically unchanged as the last week of July was brought to a close. On July 28, First latex crêpe spot was quoted 67½ cents, Smoked sheets ribbed, 67 cents, while futures for both grades for all positions, including next year, were 67 cents. Brazilian sorts were dull with Upriver fine at 68½ cents.

LONDON.

A fair demand and sufficient supplies were the reasons for the firm conditions that have ruled the London market during the past month. The consuming interests have been content with supplying their immediate requirements from available stocks at ruling spot prices but have not been attracted to any great extent by the present future offerings. The consumers are waiting for lower prices, supported by the promise of a heavy crop next year, while the producers, faced with uncertainties attending production costs, are unwilling to sell too far ahead.

Standard crêpe spot was selling on July 5 at 30d. and Smoked sheets at 29¾d. August-September was quoted 31d. and October-December 32d. Fine hard Para spot was quiet at 36d. The market continued steady, with firm prices and minor changes in value, until the end of the month. On July 28, Standard crêpe was quoted 30¾d. and Smoked sheet 30½d.

London and Liverpool imports for May were 6,700 tons compared with 10,000 tons for April. Reexports for May were 6,093 tons against 8,200 tons for April.

SINGAPORE.

There has been little demand during the month of July in the Singapore market and price values have steadily shown a downward tendency. At the auctions held June 29, July 7, 13 and 20, the average prices realized were as follows: First

latex crêpe, 56.09 cents, compared to 59.7 cents a month ago. Smoked sheets ribbed, 55.14 cents, compared to 60.19 cents last month. The total amount sold was 1,628 tons, compared to 1,549 tons sold a month ago.

NEW YORK SPOT QUOTATIONS.

	August 1, 1916.	July 1, 1917.	July 28, 1917.
PLANTATION PARAS—			
First-latex crêpe	66½ @	65½ @	67 @
*Hevea first crêpe			
Amber crêpe No. 1, pale gristly			
blanket	56 @	63 @	65 @
Amber crêpe No. 2	@	62 @	64 @
Amber crêpe No. 3	@	61 @	63 @
Amber crêpe No. 4	@	60 @	62 @
Brown crêpe, thick clean	54 @	60 @	62 @
Brown crêpe, thin clean	@	60 @	61 @
Brown crêpe, thin specky	@	58 @	59 @
Brown crêpe, rolled	@	53 @	48 @
Smoked sheet, ribbed standard			
quality	57½ @	65½ @	67 @
*Hevea ribbed smoked sheets...			
Smoked sheet, plain standard			
quality	@	64 @	64 @ 64½
*Hevea plain or smooth smoked			
sheets	@	62 @	62 @ 62½
Unsmoked sheet, standard quality			
*Hevea unsmoked sheets	@	49 @	49 @ 49½
Colombo scrap, No. 1	@	45 @	45 @ 45½
Colombo scrap, No. 2	@		
BRAZILIAN PARAS—			
Upriver fine	66½ @	69 @	68½ @ 69
Upriver medium	@	63 @	63 @
Upriver coarse	40½ @	49 @	48½ @
Upriver weak fine	@	60 @	59 @
Upriver caucho ball	41 @	44 @	42½ @
Islands fine	59 @	66 @	61 @
Islands medium	@	58 @	58 @
Islands coarse	28½ @	34 @	30 @
Islands weak fine	@	55 @	55 @
Cameta	32 @	34 @	32½ @
Lower caucho ball	36 @	41 @	39 @ 40
Petuvian line	@	67 @	66 @
Tapajos fine	@	67½ @	66 @
Tapajos caucho ball	@	40 @	39½ @
AFRICANS—			
Accra flake	33 @	31 @	31 @
Niger flake	@	31 @	31 @
Benguela, extra seconds, 28½ ...	35½ @	38 @	37½ @
Benguela, No. 2, 32½ %	@	58 @	56 @
Congo prime, black upper	@	54 @	53 @
Congo prime, red upper	@	65 @	64 @ 66
Rio Nunez ball	@	64 @	64 @ 66
Rio Nunez sheets and strings	53 @	64 @	64 @
Conakry nuggets	@	64 @	64 @
Massai sheets and strings	@	64 @	64 @
CENTRALS—			
Central scrap	34 @	45 @	42 @ 43
Central scrap and strip	38 @	44 @	41 @ 42
Central wet sheet	30 @	33 @	31 @
Corinto	41 @	44 @ 45	43 @
Esmeralda sausage	40 @	46 @	43 @
Guayule	35 @	35 @	36 @
MANICOBAS—			
Ceara negro heads	@	42 @	44 @ 48
Ceara scrap	@	32 @	27 @ 28
Manicoba special	42½ @	37½ @	45 @
Manicoba extra	@	35 @	42½ @
Manicoba regular	@	33 @	37½ @
Mangabeira thin sheet	40 @	40 @	39 @
Mangabeira thick sheet	@	37½ @	35½ @ 36
BALATA—			
Balata block	41 @	67 @	58 @ 64
Surinam sheet	72½ @	78 @	85 @ 92
EAST INDIAN—			
Assam crêpe	@	64 @	63 @
Assam onions	@	59 @	61 @
Penang block scrap	@	42 @	41 @
Pontianak pressed	15 @	18 @	18 @
Bandjermassin	8 @	11 @	11 @
Gutta Stak	18 @ 19	19 @	19½ @
Gutta percha, red Macassar	2.50 @	2.20 @	2.30 @

* Rubber Association of America nomenclature.

COMPARATIVE NEW YORK PRICES FOR JULY.

In regard to the financial situation, Albert B. Beers (broker in crude rubber and commercial paper, No. 68 William street, New York), advises as follows:

"During July the market for commercial paper has been very uncertain, most banks being in the market only occasionally off and on, and rates have been 5@5½ per cent on the best rubber names and 6@6½ per cent for those not so well known."

	1917.*	1916.	1915.
Upriver, fine	68@71	65@68	59@63
Upriver, coarse	48@50	41@42	44@47
Islands, fine	66@69	58@59	52@54
Islands, coarse	28@30	26@28	28@30
Cameta	31@33	33@34	31@32

* Figured only to July 26.

MARKET CABLE SERVICE FROM SINGAPORE.

The following reports of the weekly auctions held at Singapore have been cabled by The Waterhouse Co., Limited:

Date.	Crêpe price per lb.	Smoked sheet price per lb.	Tons sold.	Market.
June 29	55.25	53.97	389	Firmer with more inquiry.
July 7	56.52	56.52	475	Weaker and tendency downward.
July 13	56.52	55.67	365	Weaker.
July 20	56.10	54.40	399	Little demand and prices weak.

MARKET CABLE SERVICE FROM LONDON.

The following market report has been cabled from Alden's Successors, Limited, London:

	Standard Crêpe.	Ribbed Smoked Sheets.	Market.
June 25	29¾d.	29d.	Dull
July 2	29½d.	29¾d.	Steady
July 9	30d.	29½d.	Steady
July 16	30d.	30d.	Firm
July 23	31d.	31½d.	Firm

WEEKLY RUBBER REPORT.

GUTHRIE & CO., LIMITED, Singapore, report [June 1, 1917]:

The weekly rubber auction opened yesterday with a good demand for high-grade rubber, fine pale crêpe selling up to \$152, and ribbed smoked sheet to \$150 per picul. At the continuation of the sale today the demand was maintained, one lot of ribbed smoked sheet fetching \$151 per picul. The top price for fine pale crêpe is the same as last week's, and that for ribbed smoked sheet is \$1 down. For palish, brown and dark crêpes there was a brisk demand at relatively good prices, but inferior lots of smoked sheet were neglected, and a considerable quantity was brought in. Un-smoked sheet met with a moderate demand, at about last week's prices. Of 800 tons cataloged, 453 tons were sold.

The following was the course of values:

	In Singapore per Picul.*	Sterling Equivalent per Pound in London.	Equivalent per Pound in Cents.
Sheet, fine ribbed smoked, ...	\$145@151	2/11 @ 3/ ¼	61.62@64.17
Sheet, good ribbed smoked, ...	130@145	2/ 7¾ @ 2/11	55.25@61.62
Sheet, plain smoked, ...	120@129	2/ 5¾ @ 2/ 7¾	51.00@54.82
Sheet, ribbed unsmoked, ...	118@132	2/ 5¼ @ 2/ 8	50.15@56.10
Sheet, plain unsmoked, ...	115@125	2/ 4¾ @ 2/ 6¾	48.87@53.12
Crêpe, fine pale, ...	149@152	2/11¾ @ 3/ ¾	63.32@64.60
Crêpe, good pale, ...	137@149	2/ 9¼ @ 2/11¾	58.22@63.32
Crêpe, fine brown, ...	131@140	2/ 8 @ 2/ 8¾	55.67@59.50
Crêpe, good brown, ...	120@130	2/ 5¾ @ 2/ 7¾	51.00@55.25
Crêpe, dark, ...	100@121	2/ 1½ @ 2/ 5¾	42.50@51.42
Crêpe, bark, ...	68@104	1/ 6¾ @ 2/ 2¾	28.90@44.20
Scrap, virgin and pressed, ...	60@ 92	1/ 5½ @ 1/11¾	25.50@39.10
Scrap, loose, ...	80@ 81	1/ 9¼ @ 1/ 9½	34.00@34.42

* Picul = 133¼ pounds.

Quoted in S. S. dollars = 2/4 [56.7 cents].

PLANTATION RUBBER FROM THE FAR EAST.

TOTAL EXPORTS FROM MALAYA.

(From January 1, 1917 to dates named, excluding all foreign transshipments, Reported by Barlow & Co., Singapore.)

To—	Singapore.	Malacca.	Penang.	Port Swettenham.	Totals.
	April 30, 1917.	April 30, 1917.	April 30, 1917.	May 22, 1917.	
United Kingdom, lbs.	16,666,056	1,757,231	10,197,667	16,463,387	45,084,341
The Continent,	5,926,148	.....	47,067	.....	5,973,215
Japan	1,291,842	.....	.....	.....	1,291,842
Ceylon	152,334	.....	223,732	454,727	830,793
U. S. and Canada, ..	40,132,832	.....	6,220,200	553,264	46,906,296
Australia	185,413	.....	.....	.....	185,413
China (Hongkong), ..	.....	.....	.....	47,052	47,052
Totals	64,354,625	1,757,231	16,688,666	17,518,430	100,318,952
Same period, 1916..	44,699,753	1,538,534	10,879,900	8,855,995	75,974,182
Same period, 1915..	20,651,757	3,276,002	8,230,797	10,915,581	44,074,137
Same period, 1914..	12,167,672	1,772,527	5,398,000	10,860,277	30,198,476

EXPORTS OF PARA RUBBER FROM PENANG.

MAY 1-23, 1917.

To—	POUNDS.
UNITED STATES:	
Seattle	851,600
Akron	509,466
New York	346,400
San Francisco	9,066
Total	1,716,532
EUROPE:	
England—	
London	1,748,266
Liverpool	397,866
Total	2,146,132

IMPORTS AND EXPORTS OF RUBBER AND GUTTA AT SINGAPORE.

IMPORTS.

April 20-30, 1917.

From—	Para Rubber.	Para Rubber for Treatment.	Borneo Rubber.	Gutta Percha.	Gutta Jelutong.
Malay Peninsula—					
Port Swettenham, lbs.	826,000	.....	.....	.....	.....
Teluk Anson,	717,200	.....	.....	.....	.....
Muar	320,533	.....	.....	.....	.....
Penang	212,666	273,866	.....	.....	.....
Malacca	132,000	310,133	.....	.....	.....
Port Dickson	92,933	.....	.....	.....	.....
Kelantan	62,666	.....	.....	.....	.....
Kuantan	21,733	.....	.....	.....	.....
Rengat	6,933	5,466	.....	.....	.....
S. Pandjang	533	.....	.....	.....	.....
Totals	2,393,186	589,465	.....	.....	.....
Borneo—					
Pandermassin	69,333	.....	3,066	50,533	133,333
Sarawak	67,333	.....	2,133	17,066	475,466
Pontianak	43,066	2,533	1,466	4,000	49,600
Labuan	23,866	.....	.....	30,000	.....
Sambas	20,000	.....	.....	.....	.....
Jesselton	14,800	99,866	.....	266	.....
Passir	12,666	.....	.....	.....	.....
Sandakan	7,333	5,200	.....	.....	.....
Kudat	3,866	.....	.....	.....	.....
Singawang	3,333	.....	.....	.....	.....
Samarinda	1,866	.....	3,733	1,600	.....
Sampit	1,333	.....	14,666	.....	221,466
Totals	268,795	107,599	25,064	103,465	879,865
Sumatra—					
Djambi	156,000	.....	.....	.....	.....
Deli	118,433	466,800	.....	.....	.....
Palembang	19,600	.....	.....	.....	23,333
Asahan	7,733	95,200	.....	.....	.....
Siak	5,333	.....	.....	.....	.....
Indragiri	2,933	.....	.....	.....	.....
Muntok	933	.....	.....	.....	.....
Totals	310,965	562,000	.....	.....	23,333
Java—					
Sourabaya	8,133	.....	.....	.....	.....
Batavia	2,266	.....	.....	.....	.....
Samarang	1,600	.....	.....	.....	.....
Total	11,999	.....	.....	.....	.....
Siam—					
Patani	133	.....	.....	.....	.....
Bangkok .....	.....	.....	.....	8,000	.....
Totals	133	.....	.....	8,000	.....
Burma—					
Mergui	4,666	.....	.....	.....	.....
Other ports	91,466	67,733	3,333	21,200	153,333
Grand Totals	3,081,210	1,326,797	28,397	132,665	1,056,531

EXPORTS.

April 20-30, 1917.

To—	Para Rubber.	Para Rubber Trans-shipped.	Borneo Rubber.	Gutta Percha.	Gutta Jelutong.
NORTH AMERICA:					
United States—					
Akron	929,866	35,866	.....	.....	.....
New York	602,000	161,333	.....	.....	.....
Seattle	347,466	.....	.....	56,000	.....
San Francisco	190,400	.....	.....	.....	.....
Boston	168,000	.....	.....	.....	.....
Canada—					
Vancouver	563,066	.....	.....	.....	.....
Totals	2,800,798	197,199	.....	56,000	.....
EUROPE:					
United Kingdom—					
England (London) ..	384,800	.....	.....	124,400	.....
Grand Totals	3,185,598	197,199	.....	180,400	.....

IMPORTS.

May 1-3, 1917.

	Para Rubber.	Rubber.	Gutta Percha.	Gutta Jelutong.
From—	Rubber.	Treatment.	Rubber.	Gutta Percha.
Malaya	4,507,663	596,000		
Sumatra				
Java				
Siam				
Burma				
Other countries				
Totals	4,507,663	596,000		

Sumatra—				
Dumai	1,400	1,000	10,933	796,266
Palembang	1,200	3,400	22,000	60,266
Sibolga	60,000		1,200	188,533
Labuan	6,000	4,133	15,066	36,000
Sandakan	31,866	3,333	1,333	
Labuan	31,866	3,333	933	4,266
Sandakan	25,066	32,266		164,000
Sumatra	14,766		2,400	
Passer	11,733			
Kuala	30,933			
Sumatra	4,133		266	2,666
Sumatra	3,000			
Totals	297,331	317,331	29,465	1,413,599

Sumatra—				
Dumai	1,400		1,333	131,066
Palembang	1,200			
Sibolga	60,000	43,333		15,200
Labuan	6,000			
Sandakan	31,866	4,533		
Sumatra	14,766			2,666
Passer	11,733			
Kuala	30,933			
Sumatra	4,133		266	2,666
Sumatra	3,000			
Totals	410,397	297,466	2,133	148,932

Java—				
Surabaya	68,000			
Batavia	62,000			
Samarang	433			
Totals	130,433			

Siam—				
Bangkok	1,066			
Patani	933			
Total	1,999			

Burma—				
Rangoon	17,333			
Other ports	233,866	234,533	19,466	17,866
Grand Totals	5,895,284	1,445,330	48,931	1,723,197

EXPORTS.

May 1-24, 1917.

To—	Para Rubber.	Trans- shipped.	Borneo Rubber.	Gutta Percha.	Gutta Jelutong.
NORTH AMERICA					
United States—					
New York	1,333,533	1,324,666		498,666	1,480,266
Akron	1,191,200	39,600			
Seattle	1,103,266	54,933		77,200	921,600
San Francisco	219,333	4,533			
Easton	17,133				
Canada—					
Montreal	1,35,000				
Vancouver	50,866				
Granby	2,633				
Toronto	9,566				
Totals	7,873,764	1,423,732		575,866	2,401,866
EUROPE					
United Kingdom—					
England					
London	1,150,800	178,933		67,466	19,866
Liverpool	306,266	357,333			
Russia	1,583,173				
Italy	7,000			11,333	
France	31,800			24,200	
Totals	4,406,932	2,536,266		102,999	19,866
Grand Totals	12,280,696	3,959,998		678,865	2,421,732

PLANTATION RUBBER EXPORTS FROM JAVA.

	April 1916.	April 1917.	Four Months Ending April 1916.	Four Months Ending April 1917.
To—				
Holland			29,120	
Great Britain				
Ficus	4,594	1,533	8,470	4,571
Hevea	78,120	831,040	2,367,680	2,172,800
Ceara	4,354	6,514	16,427	12,707
Castilloa	5,889	6,264	18,832	13,272
Totals	77,957	845,351	2,411,409	2,203,350
United States				
Ficus	177		32,087	2,578
Hevea	2,374,400	1,933,120	5,427,520	10,868,480
Ceara			11,114	185
Castilloa				7,060
Totals	2,402,575	1,933,120	5,470,721	10,878,303
Singapore				
Ficus	5,282	1,430	17,796	7,027
Hevea	512,960	226,240	1,413,440	1,232,000
Ceara	584	550	11,812	12,080
Castilloa	110		2,365	797
Totals	518,946	228,220	1,445,413	1,251,906
Other Countries:				
Ficus			1,672	
Hevea	38,080	4,480	112,000	15,680
Totals	38,080	4,480	113,672	15,680

STRAITS SETTLEMENTS RUBBER EXPORTS.

The export of plantation rubber from Straits Settlements ports in the month of May, as officially reported by cablegram from Singapore, amounted to 6,282 tons. Of this total, 928 tons were transshipments from adjacent countries. Appended are the comparative statistics for three years:

	1915.	1916.	1917.
January	2,576	4,443	3,562
February	2,741	3,359	6,495
March	2,477	4,481	8,299
April	1,978	4,219	6,103
May	3,588	3,274	6,282
Totals	13,360	19,776	30,741

The above figures include transshipments of rubber from various places in the neighborhood of the Straits Settlements, such as Borneo, Java, Sumatra and the Malay States other than the Federated Malay States.

FEDERATED MALAY STATES RUBBER EXPORTS.

It is officially reported from Kuala Lumpur that the exports of plantation rubber from the Federated Malay States in the month of June amounted to 6,008 tons, which compares with 7,179 tons in May and 5,114 tons in the corresponding month last year. For the first half of the present year, the exports amounted to 39,471 tons compared with 27,091 tons in 1916 and 19,190 tons in 1915. Appended are the comparative statistics:

	1915.	1916.	1917.
January	3,473	4,471	5,995
February	3,411	5,207	7,250
March	3,418	4,429	7,084
April	2,777	3,914	5,955
May	2,708	3,956	7,179
June	3,403	5,114	6,008
Totals	19,190	27,091	39,471

EXPORTS OF CEYLON GROWN RUBBER.

(From January 1 to May 28, 1917. Compiled by the Ceylon Chamber of Commerce.)

To—	1917.	1916.
United Kingdom	12,999,165	7,721,711
France	1,322,371	586,650
Italy	33,000	
Russia	177,623	179,010
Western Australia		56
South Australia		
Victoria	198,353	336,016
New South Wales	61,858	63,776
United States	7,161,914	11,594,584
Canada and Newfoundland	239,694	2,240
India	25	600
Japan	26,848	94,676
Totals	22,221,478	20,579,319

(Same period 1915, 17,077,193 pounds; same period 1914, 13,167,984 pounds.) The export figures of rubber, given in the above table for 1914, include the imports reexported. (These amount to 1,641,720—1,364,436 pounds from the Straits, and 265,660 pounds from India.) To arrive at the total quantity of Ceylon rubber exported for that year deduct these imports from the total exports. The figures for 1916 and 1917 are for Ceylon rubber only.

CRUDE RUBBER ARRIVALS AT THE PORT OF NEW YORK.

The following statistics are not complete, due to Government orders prohibiting access to the records.

(These Figures Include Weight in Packages.)

PARAS.

Fine. Medium. Coarse. Caucho. Cameta. Totals.

JUNE 18.—By the *Acre* from Para:

H. A. Astlett & Co. 17,920 15,080 71,000 100,000 8,200 268,800

JUNE 17.—By the *Fagland* from Para:

H. A. Astlett & Co. 17,920 15,080 71,000 100,000 8,200 268,800
Raw Products Co. 13,502 24,000 46,761

JUNE 27.—By the *Tela* from Para and Manaos:

Aldens' Successors, Ltd. 7,610 709 1,300 12,000
J. T. Johnstone & Co., Inc. 660 6,790 5,600 16,380
Hagemeyer & Brunn. 10,000 3,300 1,000 14,300
H. A. Astlett & Co. 17,920 15,080 71,000 100,000 8,200 268,800
Meyer & Brown. 13,502 24,000 46,761

JUNE 28.—By the *Ancon* from Mollendo:

Muller, Schall & Co. 15,076 1,314 16,390

JUNE 28.—By the *Gen. W. C. Gorgas* from Mollendo:

Muller, Schall & Co. 15,076 1,314 16,390

PLANTATIONS TO NEW YORK.

JUNE 16.—By the *City of Athens*=Singapore:

J. T. Johnstone & Co., Inc. 5,434
Raw Products Co. 15,680

JUNE 21.—By the *Minnehaha*=London:

Rubber Trading Co. 33,700
Hagemeyer Trading Co. 13,440

JUNE 21.—By the *Easton*=London:

L. Littlejohn & Co., Inc. 219,520

JUNE 27.—By the *Testina*=London:

Aldens' Successors, Ltd. 573,400
Rubber Trading Co. 67,200

JUNE 23.—By the *Santa*=London:

Rubber Trading Co. 22,400
J. T. Johnstone & Co., Inc. 155,320

JUNE 28.—By the *Lacaon*=London:

Rubber Trading Co. 6,720

JUNE 28.—By the *Cyclops*=London:

Rubber Trading Co. 11,200

JUNE 30.—By the *Phoenix*=East:

Rubber Trading Co. 15,680
L. Littlejohn & Co., Inc. 112,000

JULY 1.—By the *Michigan*=London:

L. Littlejohn & Co., Inc. 87,700
Rubber Trading Co. 56,000
Raw Products Co. 41,440

JULY 3.—By the *Bagajes*=East:

Rubber Trading Co. 179,200
J. T. Johnstone & Co., Inc. 586,490
Raw Products Co. 15,680

JULY 3.—By the *Columbia*=Ceylon:

J. T. Johnstone & Co., Inc. 11,200

JULY 5.—By the *Manhattan*=London:

L. Littlejohn & Co., Inc. 4,452

JULY 5.—By the *Easton*=London:

L. Littlejohn & Co., Inc. 14,241

JULY 6.—By the *Caracalla*=London:

L. Littlejohn & Co., Inc. 78,080
Meyer & Brown. 23,300

JULY 7.—By the *Socrates*=London:

L. Littlejohn & Co., Inc. 9,270

JULY 9.—By the *Island*=Java and Batavia:

L. Littlejohn & Co., Inc. 116,480
J. T. Johnstone & Co., Inc. 597,932
General Rubber Co. 202,000
Hagemeyer Trading Co. 41,320
Raw Products Co. 8,220

By the *Nippon*=Singapore:

Henderson & Korn 514,600

By the *Danta*=London:

Aldens' Successors, Ltd. 63,422

JULY 14.—By the *Shinsei Maru*=Singapore:

Henderson & Korn 51,500

JULY 16.—By the *Eurybates*=East:

Hagemeyer Trading Co. 6,720

JULY 16.—By the *Kinlaka*=Colon: East:

L. Littlejohn & Co., Inc. 33,600
Rubber Trading Co. 4,480

JULY 16.—By the *St. Bode*=London:

L. Littlejohn & Co., Inc. 897
Meyer & Brown. 6,100

JULY 17.—By the *Prinsder Netherland*=Para maribo:

Muller, Schall & Co. 435

JULY 17.—By the *Wakasa Maru*=East:

Rubber Trading Co. 114,240
L. Littlejohn & Co., Inc. 501,760

JULY 17.—By the *Philadelphian*=London:

L. Littlejohn & Co., Inc. 47,161
Hagemeyer Trading Co. 9,059

JULY 17.—By the *Libatic*=London:

L. Littlejohn & Co., Inc. 3,000

JULY 19.—By the *Ecuador*=Singapore:

Henderson & Korn 46,000

JULY 21.—By the *Louis Nielsen*=Singapore:

Henderson & Korn 136,000

JULY 23.—By the *Unkai Maru*=Singapore:

Henderson & Korn 37,000

JULY 24.—By the *Manhattan*=London:

Aldens' Successors, Ltd. 933,400

JULY 24.—By the *Malakuta*=London:

Aldens' Successors, Ltd. 929,300
Meyer & Brown. 4,500

JULY 26.—By the *Madiven*=Singapore:

Henderson & Korn 57,000

JULY 27.—By the *Empress of Asia*=Singapore:

Henderson & Korn 359,800

By the *Nepos*=Ceylon:

J. T. Johnstone & Co., Inc. 83,918

By the *Karaka*=East:

Rubber Trading Co. 10,100
J. T. Johnstone & Co., Inc. 15,860

Fine. Medium. Coarse. Caucho. Cameta. Totals.

JULY 5.—By the *Sao Paulo* from Para:

Aldens' Successors, Ltd. 8,200 400 10,000 22,000 40,600
Muller, Schall & Co. 322 55 487 2,661 3,525
Hagemeyer & Brunn. 5,000 5,000
H. A. Astlett & Co. 11,200 33,600 44,800
Henderson & Korn. 78,500 1,200 5,000 6,200 2,000 92,900
Raw Products Co. 9,565 1,283 714 11,562
Meyer & Brown. 80,400 80,400

JULY 5.—By the *Minas Geraes* from Para:

Henderson & Korn. 30,000 30,000
Raw Products Co. 25,972 10,275 63,769 100,160

JULY 9.—By the *Tapajes* from Para and Manaos:

Muller, Schall & Co. 8,302 642 5,200 7,377 21,874
Aldens' Successors, Ltd. 6,800 500 3,500 22,000 32,800
Hagemeyer & Brunn. 33,600 25,000 12,000 70,600
H. A. Astlett & Co. 62,720 44,800 170,240 277,760
Henderson & Korn. 30,000 2,000 20,000 28,000 11,000 91,000
Meyer & Brown. 59,100 12,600 22,100 44,200 138,000

JULY 14.—By the *Tricolor* from Para:

Aldens' Successors, Ltd. 33,700 1,500 2,500 700 38,400
General Rubber Co. 25,000 3,000 12,000 40,000
Hagemeyer & Brunn. 11,200 11,200
H. A. Astlett & Co. 76,160 6,720 24,640 145,600 275,520
Henderson & Korn. 21,020 43,000 64,000
Meyer & Brown. 3,400 53,800 57,200

JULY 21.—By the *Vindeggen* from Para and Manaos:

General Rubber Co. 103,000 8,700 2,100 112,000 225,800
Henderson & Korn. 12,000 12,000
H. A. Astlett & Co. 53,760 4,480 71,680 67,200 197,120
Meyer & Brown. 106,400 3,800 6,700 266,600 383,500

*Weak Fine.

†Upper Caucho Ball.

By the *Aagot* from Para:

Raw Products Co. 155,213 155,213

POUNDS. By the *Hyson*=Ceylon: POUNDS.

J. T. Johnstone & Co., Inc. 6,720

By the *Goentier*=Ceylon:

J. T. Johnstone & Co., Inc. 54,682

By the *Empress of Japan*=East:

Rubber Trading Co. 11,200

By the *Khyber*=East:

Hagemeyer Trading Co. 13,780

By the *Perseana*=East:

Hagemeyer Trading Co. 9,095

By the *Kangean*=Batavia:

J. T. Johnstone & Co., Inc. 206,320

By the *Protesilaus*=Ceylon:

J. T. Johnstone & Co., Inc. 60,491

By the *Rondo*=Batavia:

J. T. Johnstone & Co., Inc. 9,299

By the *Roepat*=Batavia:

J. T. Johnstone & Co., Inc. 44,925

By the *Pentrik*=Batavia:

J. T. Johnstone & Co., Inc. 33,606

By the *Karaka*=Ceylon:

J. T. Johnstone & Co., Inc. 58,940

By the *Shinyo Maru*=Ceylon:

J. T. Johnstone & Co., Inc. 89,600

By the *Katori Maru*=Ceylon:

J. T. Johnstone & Co., Inc. 15,680

By the *Siberia Maru*=East:

Rubber Trading Co. 22,400

By the *Korea Maru*=East:

Raw Products Co. 6,720

AFRICANS.

JULY 23.—By the *Carmania*=Liverpool:

Rubber Trading Co. 4,480

JULY 7.—By the *Andania*=Liverpool:

Rubber Trading Co. 11,200

JULY 9.—By the *Tapajos*=Para:

Hagemeyer Trading Co. (Negroheads) 22,750

BALATA.

JULY 17.—By the *Parana*=Batavia:

Muller, Schall & Co. 20,071

GUAYULE.

	POUNDS.
July 1.—By the <i>Galveston</i>	1,85,760
Continental-Mexican Rubber Co.....	53,400
July 7.—By the <i>Sigs</i> —Galveston:	
Continental-Mexican Rubber Co.....	55,087
July 4.—By the <i>Negro</i> —Galveston:	
Continental-Mexican Rubber Co.....	36,091
July 4.—By the <i>Oriente</i> —Galveston:	
Continental-Mexican Rubber Co.....	53,520

CENTRAL SCRAP.

	POUNDS.
JUNE 21.—By the <i>Creole</i> —New Orleans:	
Muller, Schall & Co. (Mexican).....	402

SCRAP.

	POUNDS.
JUNE 21.—By the <i>Santa Marta</i> —Port Limon:	
Muller, Schall & Co. (Costa Rican)...	1,537
July 9.—By the <i>Juruba</i> —Port Limon:	
Muller, Schall & Co. (Costa Rican)....	1,320

CRUDE RUBBER ARRIVALS AT SEATTLE.

PLANTATIONS.

TO SEATTLE, WASH.

	POUNDS.
July 2.—By the <i>Limba Maru</i> —Yokohama:	
L. Littlejohn & Co.....	282,600
Mitsui & Co.....	39,555
W. R. Grace & Co.....	8,505
Robinson & Co.....	16,875
July 5.—By the <i>Sado Maru</i> —Yokohama:	
W. R. Grace & Co.....	8,100
Mitsui & Co., Limited.....	2,295
July 9.—By the <i>Kamakura Maru</i> —Yokohama:	
L. Littlejohn & Co.....	32,895
Mitsui & Co., Limited.....	56,700
July 11.—By the <i>Nippon</i> —Mojji:	
Aldens' Successors, Limited... ..	27,000
The Raw Products Co.....	4,840
W. R. Grace & Co.....	15,120
L. Littlejohn & Co.....	27,540
Arnold & Zeiss.....	20,250
July 14.—By the <i>Shinsei Maru</i> —Singapore:	
Raw Products Co.....	11,340
The B. F. Goodrich Co.....	818,370
Henderson & Korn.....	27,540
W. R. Grace & Co.....	9,585
Arthur Meyer & Co.....	18,090
Arnold & Zeiss.....	30,240
East Asiatic Co.....	9,180
L. Littlejohn & Co.....	35,640
Robinson & Co.....	7,155
July 17.—By the <i>Inaho Maru</i> —Kobe:	
Mitsui & Co.....	81,810
July 22.—By the <i>Mexico Maru</i> —Yokohama:	
Arnold & Zeiss.....	45,090
Meyer & Brown.....	3,375
Robinson & Co.....	32,400
L. Littlejohn & Co., Inc.....	36,585
July 22.—By the <i>Shidzuoka Maru</i> —Yokohama:	
Meyer, New York.....	1,755

TO AKRON, OHIO.

July 5.—By the <i>Sai Maru</i> —Yokohama:	
The Goodyear Tire & Rubber Co.....	76,410
July 6.—By the <i>Chicago Maru</i> —Yokohama:	
J. T. Johnstone & Co.....	4,860
The Goodyear Tire & Rubber Co.....	9,450

July 11.—By the <i>Nippon</i> —Mojji:	
Rubber Trading Co.....	4,860
J. T. Johnstone & Co.....	6,480
The Goodyear Tire & Rubber Co.....	163,890
Fred Stern & Co.....	2,430

July 14.—By the <i>Shinsei Maru</i> —Singapore:	
The Firestone Tire & Rubber Co.....	391,905
The Goodyear Tire & Rubber Co.....	93,825

Via Vancouver.

Meyer & Brown.....	66,230
The Goodyear Tire & Rubber Co.....	1,081,080

July 22.—By the <i>Mexico Maru</i> —Yokohama:	
The B. F. Goodrich Co.....	272,700

	POUNDS.		POUNDS.
J. T. Johnstone & Co.....	38,880		
Continental-Mexican Rubber Co.....	76,815		

TO NEW YORK.

July 5.—By the <i>Louise Nelson</i> —East:	
Aldens' Successors, Ltd.....	193,000

JUNE 21.—By the <i>Manila Maru</i> —East:	
Aldens' Successors, Ltd.....	5,000

July 5.—By the <i>Sado Maru</i> —Yokohama:	
Charles T. Wilson Co., Inc.....	2,970
J. T. Johnstone & Co.....	10,800
W. R. Grace & Co.....	51,435
East Asiatic Co.....	13,905
Arthur Meyer & Co.....	3,105

July 6.—By the <i>Chicago Maru</i> —Yokohama:	
L. Littlejohn & Co.....	2,835
Arthur Meyer & Co.....	4,455

July 9.—By the <i>Kamakura Maru</i> —Yokohama:	
Rubber Trading Co.....	17,280
Arthur Meyer & Co.....	2,700
Robinson & Co.....	2,025
L. Littlejohn & Co.....	8,100

July 11.—By the <i>Nippon</i> —Mojji:	
Henderson & Korn.....	394,470
J. T. Johnstone & Co.....	102,195
Charles T. Wilson Co., Inc.....	206,010
Robert Badenhop & Co., Inc.....	215,190
Robinson & Co.....	72,765
Winter & Sons.....	67,635
Arthur Meyer & Co.....	20,385
Fred Stern & Co.....	24,705
Balfour Williamson & Co.....	18,225
Rubber Trading Co.....	3,240
Aldens' Successors, Ltd.....	7,965
L. Littlejohn & Co.....	75,195
William H. Stiles.....	57,105

July 14.—By the <i>Shinsei Maru</i> —Singapore:	
Rubber Trading Co.....	8,910
Aldens' Successors, Ltd.....	5,940
Charles T. Wilson Co., Inc.....	32,400
L. Littlejohn & Co.....	143,100
Edward Maurer Co., Inc.....	34,020
William H. Stiles.....	21,195
Hadden & Co.....	159,435
Frank B. Ross Co.....	41,985
East Asiatic Co.....	4,860

Via Vancouver.

United States Rubber Co.....	1,141,695
Robinson & Co.....	37,800
Meyer & Brown.....	25,110

July 3.—By the <i>Euryades</i> —Colombo:	
E. G. Curry.....	10,800
Arnold & Zeiss.....	14,985

By the <i>Taisha Maru</i> —East:	
Aldens' Successors.....	13,500

TO WATERTOWN, MASS.

July 11.—By the <i>Nippon</i> —Mojji:	
The Hood Rubber Co.....	47,250

July 14.—By the <i>Shinsei Maru</i> —Singapore:	
The Hood Rubber Co.....	55,080

TO SAN FRANCISCO, CAL.

July 5.—By the <i>Sado Maru</i> —Yokohama:	
Mitsui & Co., Ltd.....	8,505

July 22.—By the <i>Mexico Maru</i> —Yokohama:	
Charles T. Wilson Co., Inc.....	1,215
Aldens' Successors.....	3,510
Fred Stern & Co.....	6,480

JUNE 20.—By the <i>Kwanto Maru</i> —East:	
Aldens' Successors, Ltd.....	18,000

TO MONTREAL, CANADA.

July 14.—By the <i>Shinsei Maru</i> —Singapore:	
Canadian Consolidated Rubber Co.....	163,620

By the <i>Mitauke</i> —London:	
Meyer & Brown.....	15,700

TO TORONTO, CANADA.

July 14.—By the <i>Shinsei Maru</i> —Singapore:	
J. T. Johnstone & Co.....	25,245

TO VANCOUVER.

July 14.—By the <i>Shinsei Maru</i> —Singapore:	
F. H. Clendenning.....	16,740

CRUDE RUBBER ARRIVALS AT CLEVELAND.

PLANTATIONS.

TO AKRON, OHIO.

JUNE 30.—By the <i>Monteagle</i> —Colombo:	
The Goodyear Tire & Rubber Co.....	46,750

PONTIANAK.

TO SEATTLE, WASH.

	POUNDS.
JULY 5.—By the <i>Sado Maru</i> —Yokohama:	
L. Littlejohn & Co. (Gutta).....	15,930
JULY 11.—By the <i>Nippon</i> —Mojji:	
L. Littlejohn & Co. (Jelutong)...	353,295
L. Littlejohn & Co. (Gutta)....	185,760
JULY 14.—By the <i>Shinsei Maru</i> —Singapore:	
L. Littlejohn & Co. (Gutta)...	59,400
L. Littlejohn & Co. (Jelutong)...	112,320
British Bank of South America (Jelutong)	104,125

TO NEW YORK.

JULY 11.—By the <i>Nippon</i> —Mojji:	
Equitable Trust Co.....	48,465
JULY 14.—By the <i>Shinsei Maru</i> —Singapore:	
L. Littlejohn & Co. (Gutta).....	30,105

AT PACIFIC COAST.

JULY 21.—By the <i>Ceylon Maru</i> —East:	
Meyer & Brown.....	2,240

JULY 23.—By the <i>Mexico Maru</i> —East:	
Meyer & Brown.....	4,480

JULY 23.—By the <i>Unkai Maru</i> —East:	
Meyer & Brown.....	201,600

By the <i>Tjondavari</i> —East:	
Meyer & Brown.....	33,600

By the <i>Panama</i> —East:	
Meyer & Brown.....	4,480

By the <i>Siberia Maru</i> —East:	
Meyer & Brown.....	11,200

TO NEW YORK.

JULY 9.—By the <i>Ratu</i> —Java and Batavia:	
Hagemeyer Trading Co.....	190,400

CRUDE RUBBER ARRIVALS AT SAN FRANCISCO.

PLANTATIONS.

JUNE 25.—By the <i>Madien</i> —Sourabaya:	
Firestone Tire & Rubber Co... ..	390,420
The B. F. Goodrich Co.....	368,280
Henderson & Korn.....	39,690
Hagemeyer Trading Co.....	54,540
L. Littlejohn & Co.....	125,145
Edgar & Co.....	68,175
E. S. Kuh & Valk Co.....	84,645
Arnold & Zeiss.....	6,885
The Goodyear Tire & Rubber Co.....	18,225
Edward Maurer & Co.....	77,490
Winter & Sons.....	42,390

JUNE 29.—By the <i>Soerakarta</i> —Rotterdam:	
The Firestone Tire & Rubber Co.....	154,170
The B. F. Goodrich Co.....	203,445
H. B. M. Consul General.....	40,770
Edward Maurer & Co.....	170,910
Edgar & Co.....	22,140
H. Peabody.....	41,850
E. S. Kuh & Valk Co.....	25,245
L. Littlejohn & Co.....	106,785

JULY 19.—By the <i>China</i> —Hong Kong:	
Obalski & Sweeny.....	8,775
United States Rubber Co.....	210,060
Charles T. Wilson Co.....	81,810
Arnold & Zeiss.....	6,885
L. Littlejohn & Co.....	130,545
Edward Maurer & Co.....	27,540
William H. Stiles Co.....	36,855

JULY 16.—By the <i>Insulan</i> —Batavia:	
Firestone Tire & Rubber Co... ..	174,420
J. T. Johnstone & Co.....	49,140
Edward Maurer & Co.....	238,950
Arnold & Zeiss.....	141,210
Meyer & Brown.....	27,270
Edgar & Co.....	9,045
H. B. M. Consul General.....	46,575
Henry W. Peabody & Co.....	7,695
The Goodyear Tire & Rubber Co.....	721,980

JULY 19.—By the *Ecuador*—Singapore:

	POUNDS.
General Rubber Co.	135
The International Trading Co.	51,975
Wilson, Holgate & Co.	44,955
W. T. Basley.	945
East Asiatic Co.	135,675
Katz Bros.	20,655
The Goodyear Tire & Rubber Co.	89,235
W. R. Grace & Co.	10,665
	354,240

JULY 23.—By the *Unkai Maru* No. 2—Colombo:

Henderson & Kohn.	25,110
Charles T. Wilson Co., Inc.	26,730
W. R. Grace & Co.	9,180
Bowers Rubber Works.	10,395
Arnold & Zeiss.	27,945
E. Maurer & Co.	17,415
Arthur Meyer & Co.	17,820
Meyer & Brown.	160,650
Guaranty Trust Co.	649,350
Goodyear Tire & Rubber Co.	50,220
	994,815

PONTIANAK.

JUNE 25.—By the *Madien*—Sourabaya:

L. Littlejohn & Co. (Gutta)....	114,480
United Malaysian Co. (Gutta Siak)	118,800
	233,280

JUNE 29.—By the *Saerakarta*—Rotterdam:

Goldman, Sachs & Co.	22,950
L. Littlejohn & Co.	51,435
	74,385

JULY 19.—By the *China*—Hongkong:

Charles Demarest & Co. (Gutta Siak)	6,075
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JULY 23.—By the *Unkai Maru* No. 2—Colombo:

Bowers Rubber Works (Gutta).....	21,000
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CUSTOM HOUSE STATISTICS.

PORT OF BOSTON, MASS.—JUNE, 1917.

IMPORTS:	POUNDS.	VALUE.
India rubber	197,736	\$117,182
Rubber scrap	702	56
Manufactures of india rubber		4,390
Totals	198,438	\$121,628

EXPORTS:

Rubber boots	10,484	\$21,315
Rubber shoes	23,333	39,771
Automobile tires		2,333
Other rubber tires		87
Belting, hose, etc.		1,506
All other manufactures of india rubber		4,280
Totals	33,817	\$69,292

PORT OF CHICAGO, ILLINOIS—JUNE, 1917.

IMPORTS:	POUNDS.	VALUE.
Rubber scrap	202,502	\$14,593
Manufactures of india rubber		527
Totals	202,502	\$15,120

PORT OF CLEVELAND, OHIO—JUNE, 1917.

IMPORTS:	POUNDS.	VALUE.
India rubber	128,513	\$141,800
Rubber scrap	118	9
Manufactures of india rubber		8,616
Totals	128,631	\$150,425

PORT OF GALVESTON, TEXAS—JUNE, 1917.

No transactions.

PORT OF NEW ORLEANS, LOUISIANA—MAY, 1917.

IMPORTS:	POUNDS.	VALUE.
India rubber	36,656	\$15,275

PORT OF NEW ORLEANS, LOUISIANA—JUNE, 1917.

IMPORTS:	POUNDS.	VALUE.
India rubber	26,229	\$10,990

PORT OF SAN FRANCISCO, CALIFORNIA—MAY, 1917.

IMPORTS:	POUNDS.	VALUE.
India rubber	7,975,826	\$5,205,925
Rubber scrap	75,596	2,536
Gutta jelutong	128,727	10,852
Totals	8,180,149	\$5,219,313

EXPORTS:

India rubber boots.....pairs	25	\$103
India rubber shoes.....pairs	8,334	5,518
Automobile tires		115,429
Other rubber tires		8,150
Belting, hose, etc.		39,235
All other manufactures of india rubber		20,902
Totals		\$189,337

PORTS OF SEATTLE AND TACOMA, WASHINGTON—MAY, 1917.

IMPORTS:	POUNDS.	VALUE.
India rubber	4,373,832	\$2,665,450
Gutta jelutong (Pontianak)	216,564	8,259
Manufactures of india rubber		102
Gutta Siak	84,216	8,562
Totals	4,674,612	\$2,682,373

EXPORTS:

India rubber boots.....pairs	112	\$475
India rubber shoes.....pairs	1,755	1,067
Automobile tires		12,119
Other rubber tires		133
Belting, hose, etc.		3,101
All other manufactures of india rubber		4,457
Total		\$21,352

RUBBER STATISTICS FOR THE UNITED STATES.

IMPORTS OF CRUDE AND MANUFACTURED RUBBER.

UNMANUFACTURED free:	POUNDS.	VALUE.
India rubber:		
From—		
France	33,026	\$19,195
Portugal	474,637	203,657
United Kingdom	7,950,380	5,771,599
Central American States and British Honduras..	107,347	51,168
Mexico	116,127	53,131
Brazil	5,590,783	2,663,719
Other South America....	1,168,704	550,694
East Indies	18,697,068	10,889,769
Other countries	598,193	368,705
Totals	34,736,265	\$20,571,637
Balata	412,467	\$211,259
Guayule gum	328,545	80,511
*Gutta jelutong	862,933	38,432
Gutta percha	328,735	144,993
Totals	36,668,945	\$21,046,832
Rubber scrap	1,661,744	169,428
Totals unmanufactured..	38,330,689	\$21,216,260
Chicle	596,127	\$301,384
MANUFACTURED—dutiable:		
Gutta percha		\$10,181
India rubber		78,423
Totals, manufactured...		\$88,604
Substitutes—elasticon, etc....		\$18,822

EXPORTS OF DOMESTIC MERCHANDISE.

MANUFACTURED—	POUNDS.	VALUE.
Automobile tires:		
To—		
France		\$88,396
Russia in Europe.....		2,254
England		124,895
Canada		106,704
Mexico		31,642
Cuba		85,683
Australia		69,888
New Zealand		128,824
Philippine Islands		5,991
Other countries		622,737
Total		\$1,267,014
All other tires.....		\$128,336
Belting, hose and packing..		284,329
Rubber boots.....pairs	37,935	87,777
Rubber shoes.....pairs	164,047	85,699
Scrap and old rubber.....	529,677	45,536
Reclaimed rubber	709,663	110,551
Other rubber manufactures..		707,307
Totals, manufactured....		\$2,716,849
Fountain pens.....number	13,943	\$10,782

EXPORTS OF FOREIGN MERCHANDISE.

UNMANUFACTURED—	POUNDS.	VALUE.
Balata	78,359	\$48,462
Guayule gum		
Gutta jelutong		
Gutta percha		
India rubber	756,302	460,667
Rubber scrap and refuse....	626	135
Totals, unmanufactured.	835,287	\$509,264
Chicle	128	\$54

Manufactured—	POUNDS.	VALUE.
India rubber		\$4,567
Substitutes—elasticon, etc.		26

EXPORTS OF RUBBER GOODS TO NON-CONTIGUOUS TERRITORIES OF THE UNITED STATES.

MANUFACTURED:	POUNDS.	VALUE.
To—		
Alaska:		
Belting, hose and packing.		\$29,656
Boots and shoes.....pairs	13,066	34,401
Other rubber goods.....		4,096
Totals	13,066	\$68,153
To—		
Hawaii:		
Belting, hose and packing.		\$6,899
Automobile tires		55,334
Other tires		8,358
Other rubber goods.....		13,356
Total		\$83,947

To—	POUNDS.	VALUE.
Philippine Islands:		
Belting, hose and packing.		\$3,865
Boots and shoes.....pairs	12,914	9,700
Tires		8,965
Other rubber goods.....		3,337
Totals	12,914	\$25,867
To—		
Porto Rico:		
Belting, hose and packing.		\$2,954
Automobile tires		37,323
Other tires		965
Other rubber goods.....		3,597
Total		\$44,839

* Dutiable beginning July 1, 1916.

RUBBER STATISTICS FOR ITALY. IMPORTS OF CRUDE AND MANUFACTURED RUBBER.

UNMANUFACTURED—	POUNDS.	VALUE.
India rubber and gutta percha—raw and reclaimed:		
From—		
Great Britain	106,920	
African French Colony....	12,540	
Belgian Congo	119,900	
Brazil	603,460	
Other countries	310,660	
Totals	1,153,460	4,194,400
Rubber scrap	105,380	43,110

MANUFACTURED—	POUNDS.	VALUE.
India rubber and gutta percha—threads:		
From—		
Great Britain	3,740	
Other countries	220	
Totals	3,960	36,000
India rubber and gutta percha—sheets:		
Cut sheets	220	
Hard rubber	4,840	
Totals	5,060	17,600

India rubber and gutta percha—tubes:	POUNDS.	VALUE.
From cut sheet	220	1,800
Plastic fabrics	4,620	12,600
Other forms	440	1,400
Belting	11,440	36,400
Rubber coated fabrics.....	9,020	57,400

Other fabrics:	POUNDS.	VALUE.
From—		
Great Britain	4,620	
Other countries	2,420	
Totals	7,040	32,000
Boots and shoes.....pairs		
From—		
France	3,137	
United States	1,606	
Totals	4,743	23,715

February, 1917.		May, 1917.	
Elastic webbing:			
To—			
Switzerland	21,780	Switzerland	21,780
Other countries	5,940	Other countries	5,940
Tires and tubes:		Tires and tubes:	
Great Britain	63,580	Great Britain	63,580
Other countries	49,500	Other countries	49,500
Other rubber manufactures:		Other rubber manufactures:	
From—		From—	
Great Britain	10,340	Great Britain	10,340
United States	16,720	United States	16,720
Other countries	220	Other countries	220
Totals	114,180	Totals	114,180

EXPORTS OF CRUDE AND MANUFACTURED RUBBER.

February, 1917.		May, 1917.	
UNMANUFACTURED		UNMANUFACTURED	
India rubber and gutta percha	72,600	India rubber and gutta percha	72,600
Waste and reclaimed rubber	159,060	Waste and reclaimed rubber	159,060
Totals	231,660	Totals	231,660
MANUFACTURED		MANUFACTURED	
India rubber and gutta percha threads:		India rubber and gutta percha threads:	
To—		To—	
Great Britain	3,300	Great Britain	3,300
Switzerland	2,200	Switzerland	2,200
Other countries	440	Other countries	440
Totals	15,180	Totals	15,180
India rubber and gutta percha—sheets:		India rubber and gutta percha—sheets:	
Cut sheets	660	Cut sheets	660
Elastic fabric	880	Elastic fabric	880
Insulated wire	1,320	Insulated wire	1,320
Motorcycle tires and tubes:		Motorcycle tires and tubes:	
Great Britain	9,020	Great Britain	9,020
Other countries	9,680	Other countries	9,680
Rubber coated fabrics..pieces	14,300	Rubber coated fabrics..pieces	14,300

EXPORTS.		May, 1917.	
Waste and reclaimed rubber.	1,257,400	Pounds.	£ Sterling.
Boots and shoes...doz. pairs	6,482		
Insulated wire	9,158		
Submarine cables	3,322		
Automobile tires and tubes..	113,434		
Motorcycle tires and tubes..	5,730		
Cycle tires and tubes.....	26,404		
Tires not specified.....	11,605		
Manufactures not specified..	148,907		
Totals	378,698		

EXPORTS—FOREIGN AND COLONIAL.

May, 1917.		May, 1917.	
UNMANUFACTURED		UNMANUFACTURED	
Crude rubber	13,996,800	Pounds.	£ Sterling.
Waste and reclaimed rubber.	87,900		
Gutta percha	20,048		
Totals	14,104,748		
MANUFACTURED		MANUFACTURED	
Boots and shoes...doz. pairs	3,462		
Insulated wire	6,998		
Automobile tires and tubes..	79,414		
Motorcycle tires and tubes..	347		
Totals	91,707		

The value of £ Sterling is \$4.76.

LONDON AND LIVERPOOL RUBBER STATISTICS.

The import and export figures by countries usually published in this table are withheld by the British Government.

IMPORTS.

May, 1917.		May, 1917.	
UNMANUFACTURED		UNMANUFACTURED	
Crude rubber:		Crude rubber:	
At—		At—	
London	11,366,100	London	11,366,100
Liverpool	3,620,500	Liverpool	3,620,500
Totals	14,986,600	Totals	14,986,600
Waste and reclaimed rubber:		Waste and reclaimed rubber:	
At—		At—	
London	22,800	London	22,800
Liverpool	120,800	Liverpool	120,800
Totals	143,600	Totals	143,600

EXPORTS.

May, 1917.		May, 1917.	
UNMANUFACTURED		UNMANUFACTURED	
Waste and reclaimed rubber	621,500	Waste and reclaimed rubber	621,500
Manufactures of the United Kingdom:		Manufactures of the United Kingdom:	
From—		From—	
London	282,600	London	282,600
Liverpool	282,600	Liverpool	282,600
Totals	564,100	Totals	564,100

RE-EXPORTS.

May, 1917.		May, 1917.	
UNMANUFACTURED		UNMANUFACTURED	
Crude rubber:		Crude rubber:	
From—		From—	
London	11,081,600	London	11,081,600
Liverpool	2,577,900	Liverpool	2,577,900
Totals	13,659,500	Totals	13,659,500
Waste and reclaimed rubber:		Waste and reclaimed rubber:	
From—		From—	
London	4,500	London	4,500
Liverpool	60,700	Liverpool	60,700
Totals	65,200	Totals	65,200

UNITED KINGDOM RUBBER STATISTICS.

The import and export figures by countries usually published in this table are withheld by the British Government.

IMPORTS.

May, 1917.		May, 1917.	
UNMANUFACTURED		UNMANUFACTURED	
Crude rubber	16,104,900	Crude rubber	16,104,900
Waste and reclaimed rubber.	508,200	Waste and reclaimed rubber.	508,200
Gutta percha	343,280	Gutta percha	343,280
Totals	16,956,380	Totals	16,956,380
MANUFACTURED		MANUFACTURED	
Boots and shoes...doz. pairs	4,883	Boots and shoes...doz. pairs	4,883
Insulated wire	1,603	Insulated wire	1,603
Automobile tires and tubes..	152,473	Automobile tires and tubes..	152,473
Motorcycle tires and tubes..	9,791	Motorcycle tires and tubes..	9,791
Cycle tires and tubes.....	28,416	Cycle tires and tubes.....	28,416
Tires not specified	125	Tires not specified	125
Totals	204,929	Totals	204,929

EXPORTS OF INDIA RUBBER FROM PARA AND MANAOS DURING MAY, 1917.

NEW YORK.					EUROPE.					Grand Totals.	
EXPORTERS.	Fine.	Medium.	Coarse.	Caucho.	Total.	Fine.	Medium.	Coarse.	Caucho.	Total.	
Stowell & Co.....	91,399	13,739	95,706	224,164	425,008	73,691	4,213	1,137	.....	99,041	524,049
General Rubber Co.....	296,288	29,703	101,842	240,807	668,640	.....	.....	.....	.....	.....	668,640
Suarez Hermanos & Co., Limited.	105,063	536	39,165	94,457	239,221	36,245	.....	9,861	43,107	89,273	328,494
J. Marques	47,811	14,605	66,702	71,537	200,655	36,230	.....	.....	.....	36,230	236,885
Pires Peixeira & Co.....	79,281	8,370	56,557	58,086	202,294	16,980	.....	.....	.....	16,980	219,274
G. Fradelizi & Co.....	66,280	6,739	83,952	58,374	215,345	.....	.....	.....	.....	.....	215,345
Chamié & Co.....	14,450	.....	40,440	101,400	156,290	.....	.....	.....	.....	.....	156,290
Berringer & Co.....	77,392	4,735	10,186	50,332	142,645	.....	.....	.....	.....	.....	142,645
Bitar Irmãos	9,440	3,040	1,050	79,050	92,580	.....	.....	.....	10,500	10,500	103,080
Adelbert H. Alden, Limited.....	11,050	4,951	23,356	.....	39,357	30,260	.....	.....	6,458	36,718	76,075
Seligmann & Co.....	11,971	.....	1,310	53,442	66,723	.....	.....	.....	.....	.....	66,723
Sundries	26,517	1,940	25,593	33,525	87,575	43,287	2,308	1,303	2,002	48,900	136,475
Totals	836,942	88,358	545,859	1,065,174	2,536,333	256,693	6,521	12,301	62,127	337,642	2,873,975
From Manãos	269,588	57,144	159,043	532,196	1,017,971	142,904	67,399	5,934	139,579	355,816	1,373,787
Totals	1,106,530	145,502	704,902	1,597,370	3,554,304	399,597	73,920	18,235	201,706	693,458	4,247,762

Compiled by Stowell & Co.

EXPORTS OF INDIA RUBBER FROM MANAOS DURING JUNE, 1917.

EXPORTERS.	NEW YORK.					EUROPE.					GRAND TOTALS.
	Fine.	Medium.	Coarse.	Caucho.	TOTAL.	Fine.	Medium.	Coarse.	Caucho.	TOTAL.	
Stowell & Co., .....	.....	.....	4,084	48,120	75,801	.....	.....	.....	.....	.....	75,801
General Rubber Co. of Brazil,	15,991	.....	6,119	24,690	50,000	34,720	37,200	99	74,981	147,000	197,000
H. Baling, .....	.....	.....	.....	.....	.....	39,008	3,625	.....	.....	43,596	43,596
J. G. Araujo,	958	68	4,722	160	5,668	24,052	4,510	5,451	2,579	36,592	42,500
G. Fradelizi, .....	.....	.....	3,812	19,778	23,590	.....	16,651	.....	.....	16,651	40,241
Tancredo Porto & Co.,	4,480	.....	6,269	2,113	12,862	3,743	5,779	.....	.....	9,579	22,441
Adelbert H. Alden, Ltd., .....	.....	3,570	1,950	9,920	15,440	2,691	20	44	.....	3,941	19,381
Mesquita & Co., .....	.....	.....	.....	.....	.....	294	800	1,890	.....	3,024	3,024
Ohliger & Co.,	146	.....	.....	1,207	1,599	.....	.....	.....	.....	.....	1,599
W. Peters, .....	.....	.....	120	600	720	.....	.....	.....	.....	.....	720
Totals, Manaus,	43,175	8,860	27,297	106,588	185,920	104,508	68,585	8,447	78,843	260,383	446,303
In transit, Iquitos, .....	.....	.....	599	2,644	3,243	.....	.....	.....	.....	.....	3,243
Totals,	43,175	8,860	27,896	109,232	189,163	104,508	68,585	8,447	78,843	260,383	449,546

EXPORTS OF INDIA RUBBER FROM MANAOS FROM JANUARY TO JUNE, 1917.

EXPORTERS.	NEW YORK.					EUROPE.					GRAND TOTALS.
	Fine.	Medium.	Coarse.	Caucho.	TOTAL.	Fine.	Medium.	Coarse.	Caucho.	TOTAL.	
Stowell & Co., .....	.....	.....	142,126	592,824	989,179	347,331	41,852	7,537	75,236	471,956	1,461,135
General Rubber Co. of Brazil,	541,554	80,126	27,448	761,072	1,653,000	554,752	143,401	16,972	325,935	1,041,000	2,694,000
Tancredo Porto & Co.,	655,715	13,988	291,885	251,063	1,336,662	390,767	49,139	2,116	110,557	552,579	1,889,241
J. G. Araujo,	364,155	.....	194,850	13,252	606,779	248,174	24,807	27,704	98,289	398,974	1,005,753
Adelbert H. Alden, Ltd.,	26,011	58,673	95,892	74,739	255,315	433,370	1,844	2,432	169,482	607,128	862,443
Ohliger & Co.,	289,148	19,493	78,287	157,849	544,777	.....	.....	.....	.....	.....	544,777
H. Baling,	20,985	.....	.....	.....	.....	103,168	8,238	.....	27,718	142,364	163,349
G. Fradelizi, .....	.....	6,649	4,118	80,746	91,513	21,120	16,651	3,240	.....	37,771	129,284
Madeira Mamore Railway,	839	.....	.....	48,939	50,026	.....	.....	.....	.....	.....	50,026
J. L. Traquair, .....	.....	.....	8,354	1,200	33,899	.....	.....	.....	.....	.....	33,899
G. Fradelizi & Co.,	2,418	11,768	.....	.....	33,186	.....	.....	.....	.....	.....	33,186
Gunzburger & Co.,	16,807	1,473	7,113	5,876	32,069	.....	.....	.....	.....	.....	32,069
W. Peters,	7,820	450	8,880	11,615	28,765	.....	.....	.....	.....	.....	28,765
H. Semper,	7,792	2,425	11,504	4,573	26,294	.....	.....	.....	.....	.....	26,294
A. F. de Souza & Co.,	14,188	.....	2,818	5,161	22,167	.....	.....	.....	.....	.....	22,167
S. A. Armazens Andersen,	17,095	.....	.....	.....	17,095	.....	.....	.....	.....	.....	17,095
Thomas Levy Camille & Co., .....	.....	.....	.....	.....	.....	5,067	466	4,607	730	11,170	11,170
Semper & Co., .....	.....	.....	990	.....	9,950	.....	.....	.....	.....	.....	9,950
B. Levy & Co., .....	.....	.....	.....	.....	.....	7,626	932	610	300	9,468	9,468
Moraes, Carneiro & Co., .....	.....	.....	.....	.....	.....	2,617	1,677	1,014	2,352	7,660	7,660
H. Pralov,	2,082	66	4,028	1,197	7,373	.....	.....	.....	.....	.....	7,373
Mesquita & Co.,	160	.....	.....	.....	.....	614	1,211	3,140	.....	5,194	5,354
Americo Fernandes,	1,100	140	3,740	.....	4,980	.....	.....	.....	.....	.....	4,980
Vianira Andrade & Co., .....	.....	.....	.....	130	130	.....	.....	.....	.....	.....	130
Totals, Manaus,	2,533,633	374,631	1,125,785	2,010,235	5,764,304	2,114,606	290,218	69,421	310,314	3,285,264	9,049,568
In transit, Iquitos,	158,713	12,288	80,729	187,645	439,375	87,481	10,936	36,833	156,639	291,889	731,264
Totals,	2,692,346	386,919	1,206,514	2,197,880	6,203,679	2,202,087	301,154	106,454	967,458	3,577,153	9,780,832

EXPORTS OF INDIA RUBBER FROM PARA AND MANAOS DURING JUNE, 1917.

EXPORTERS.	NEW YORK.					EUROPE.					GRAND TOTALS.
	Fine.	Medium.	Coarse.	Caucho.	TOTAL.	Fine.	Medium.	Coarse.	Caucho.	TOTAL.	
Stowell & Co.,	13,684	.....	16,609	22,088	55,517	35,994	5,087	4,660	23,499	69,240	124,757
J. Marques,	57,639	.....	58,786	48,662	171,091	23,479	.....	.....	30,051	53,530	224,621
Suarez Hermanos & Co., Ltd.,	90,968	.....	13,631	36,440	140,369	.....	.....	.....	15,026	15,026	155,395
Pires Teixeira & Co.,	47,092	4,041	26,597	18,437	96,161	.....	.....	.....	.....	.....	96,161
Chamié & Co.,	16,588	.....	23,010	41,550	81,540	.....	.....	.....	.....	.....	81,540
General Rubber Co.,	25,387	3,065	10,245	32,173	70,402	10,200	.....	.....	.....	10,200	80,602
Butar Irmãos,	2,400	.....	1,120	66,150	70,310	982	134	658	.....	2,086	72,396
Adelbert H. Alden, Ltd.,	19,435	1,220	8,430	900	29,900	850	.....	.....	.....	1,150	31,050
Schenck & Co.,	3,378	.....	2,705	2,874	28,957	.....	.....	.....	.....	.....	28,957
G. Fradelizi & Co.,	17,714	1,770	6,985	2,439	26,708	.....	.....	.....	.....	.....	26,708
Sundries,	5,947	170	3,098	26,396	35,011	5,868	640	94	.....	6,914	41,925
From Manaus,	317,437	14,186	171,216	298,109	805,966	77,373	5,861	5,412	74,600	163,246	969,212
Totals,	711,387	15,356	142,632	314,624	750,767	104,508	68,585	8,504	78,786	260,383	1,011,150
Totals,	888,640	41,512	313,848	612,733	1,556,733	181,881	74,446	13,916	153,386	423,299	1,980,362

EXPORTS OF INDIA RUBBER FROM PARA FROM JANUARY TO JUNE, 1917.

EXPORTERS.	NEW YORK.					EUROPE.					GRAND TOTALS.
	Fine.	Medium.	Coarse.	Caucho.	TOTAL.	Fine.	Medium.	Coarse.	Caucho.	TOTAL.	
Stowell & Co.,	613,664	78,670	459,506	531,035	1,682,875	763,463	52,108	20,083	62,007	897,661	2,580,536
J. Marques,	277,352	106,036	523,216	217,180	1,123,784	963,762	53,771	99,760	322,374	1,439,667	2,563,451
General Rubber Co.,	848,554	69,654	558,408	491,855	1,968,471	124,082	11,858	5,676	805	142,421	2,110,892
Suarez Hermanos & Co., Ltd.,	634,358	536	67,876	194,961	917,431	118,688	.....	38,836	166,158	323,682	1,241,113
Pires Teixeira & Co.,	445,444	51,982	346,229	199,892	1,043,547	64,915	.....	.....	.....	64,915	1,109,013
G. Fradelizi & Co.,	170,346	26,893	215,554	120,073	532,866	120,243	2,583	.....	10,350	133,176	666,042
Adelbert H. Alden, Ltd.,	62,537	27,568	99,641	20,927	210,673	354,334	.....	.....	.....	364,051	574,724
Bernard & Co.,	258,708	23,331	70,870	107,109	460,018	.....	.....	.....	.....	.....	460,018
Chamié & Co.,	40,583	97	116,138	255,646	412,464	.....	.....	.....	.....	.....	412,464
Butar Irmãos,	15,360	5,600	2,770	187,650	211,380	982	134	658	5,100	5,100	417,564
Seligmann & Co.,	79,457	.....	15,275	107,645	202,393	.....	.....	.....	10,812	12,586	223,966
Sundries,	129,622	4,794	193,293	213,435	541,144	88,603	10,501	5,862	40,584	145,550	686,694
Totals, Para,	3,595,655	387,177	2,668,776	2,647,408	9,300,046	2,599,072	130,955	170,875	628,458	3,529,360	12,836,406
From Itacatiara,	4,350	.....	2,760	17,406	24,600	.....	.....	1,300	2,720	6,180	30,870
From Manaus,	2,236,407	387,281	1,150,449	2,007,480	5,781,417	2,114,606	290,218	69,678	810,762	3,285,264	9,065,681
From Iquitos,	159,302	12,288	78,215	158,954	400,759	87,481	10,936	36,833	156,639	291,889	692,648
Totals,	5,995,644	794,086	3,894,940	4,828,242	15,512,912	4,803,319	432,109	278,686	1,598,579	7,112,693	22,625,605
From Para to Rio de Janeiro—	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
J. Marques,	154,507	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Alves Braga & Co.,	200	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Totals,	154,707	.....	.....	.....	.....	.....	.....	.....	.....	.....	154,867
From Manaus to Rio de Janeiro—	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Mesquita Co.,	160	.....	.....	.....	.....	.....	.....	.....	.....	.....	2,790,472

HOLLAND IMPORTS OF RUBBER.

In tons

Gulden

From	1916	1917	
Belgium	1,000	1,000	—
Great Britain	1,000	1,000	—
Germany	1,000	1,000	—
Java, etc.	7,000	7,000	—
Other countries	113,000	2,000	—

Totals

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Gutta percha, crude:

From	1916	1917	
Belgium	176,000	241,000	+
Great Britain	176,000	241,000	+
Germany	176,000	241,000	+
Other countries	1,000	31,000	+
Totals	501,000	513,000	+

India rubber manufactures:

From	1916	1917	
Belgium	2,417,000	1,000	—
Great Britain	2,271,000	3,010,000	+
Java	8,520,000	—	—
Germany	106,000	160,000	+
United States	12,000	28,000	+
Other countries	912,000	724,000	—
Totals	14,238,000	3,923,000	—

One Gulden is equivalent to \$0.40 United States Currency.
(Converted to United States Currency in table below.)

Gutta percha, crude:	Value.		Increase or Decrease.
	1914.	1915.	
From—			
France	\$12,400	—	\$12,400
Great Britain	219,600	\$11,600	— 208,000
Dutch Gambia	297,600	34,000	— 263,600
Dutch East Indies	283,600	—	283,600
Other countries	45,200	800	— 44,400
Totals	\$858,400	\$46,400	— \$812,000

Gutta percha, manufactures:

From—	1916	1917	
Belgium	\$201,200	\$800	— \$200,400
Great Britain	70,400	96,400	— 26,000
Germany	88,400	3,200	— 85,200
Other countries	400	12,400	— 12,000
Totals	\$360,400	\$112,800	— \$247,600

India rubber manufactures:

From	1916	1917	
Belgium	\$966,800	\$400	— \$966,400
Great Britain	908,400	1,204,000	— 295,600
Java	3,408,000	—	3,408,000
Germany	42,400	64,000	— 21,600
United States	4,800	11,200	— 6,400
Other countries	364,800	289,600	— 75,200
Totals	\$5,654,400	\$1,569,200	— \$4,085,200

THE MARKET FOR RUBBER SCRAP.

Copyright 1917

NEW YORK.

THE rubber scrap market developed a pronounced weakness during the latter part of June that continued into the first week of the month just passed when all grades shared in the general downward movement. The absence of actual buying during the entire month has failed to support the sagging mar-

ket and the amount of real business reported was confined to contract deliveries and small lot orders. In spite of the dull market conditions values have been supported in a manner that shows confidence in the future. With crude rubber at unusually low prices the demand for scrap and reclaim will naturally be curtailed, however with the rubber mills busy on war orders and reclaim moving freely there is hope not long deferred for better conditions in the rubber scrap market.

BOOTS AND SHOES. The market for this material has been generally inactive although some transactions have been reported that would indicate at least a passing interest in boots and shoes. Prices for delivered lots are said to be 9½ cents, but reclaimers persist in offering 9¾ cents. Trimmed arctics have failed in interest at 7¾ cents and untrimmed are nominal at 6¾ cents. The hope of the boot and shoe situation is based on the large war orders that the rubber mills are working on to meet government requirements.

TIRES. The tire situation has been affected by the ruling sluggish conditions that are in a measure seasonable and expected in the trade. White G. & G. tires have been shown very little interest, and the mixed tire business transacted during the month has been almost negligible. Prices are ½ to ¼ cent lower than our quotations last month. However solid and bicycle tires have experienced a fair demand at firm prices.

INNER TUBES. This material appears to have been entirely neglected with the exception of small lot orders. Inner tubes free from patches and valve seats is a new grade provided for in the new rubber specifications.

MECHANICALS. There has been practically no movement in mechanicals last month, and prices, with few exceptions, have not changed.

LONDON AND LIVERPOOL STATISTICS. The London and Liverpool imports of waste and reclaimed rubber for May were 143,600 pounds, compared to 167,300 pounds for April. Reexports for May were 65,200 against 22,300 for April. Exports of waste and reclaimed rubber manufactures of the United Kingdom for May were 904,100 pounds, against 1,062,300 pounds for April.

NEW YORK QUOTATIONS FOR CARLOAD LOTS DELIVERED.

JULY 25, 1917.

Prices subject to change without notice.

	PER POUND.
Boots and shoes.....	\$0.09½ @
Trimmed arctics .....	.07 ¾ @
Untrimmed arctics .....	.06 ¾ @
White tires, Goodrich and Goodyear.....	.07 ¾ @
Auto tires, standard white.....	.07 ¾ @
standard mixed .....	.07 @
stripped, unguaranteed .....	.06 @
Auto peelings, No. 1.....	.10 @
No. 2.....	.08 ¾ @ .09
Inner tubes, No. 1.....	.26 @ .26½
No. 2.....	.13 @ .13½
red .....	.13½ @
Irony tires .....	.13½ @
Bicycle tires .....	.05 ¾ @
Solid tires .....	.07 @
Clean truck tires .....	.08 @
White scrap, No. 1.....	.13½ @ .14
No. 2.....	.10 @
Red scrap, No. 1.....	.09¾ @ .10
No. 2.....	.07¾ @
Mixed black scrap, No. 1.....	.05 @ .05½
No. 2 .....	.04¼ @ .04¾
Rubber car springs.....	.05½ @
Horse shoe pads.....	.05 @
Matting and packings.....	.01¾ @
Garden hose .....	.02¼ @
Air brake hose.....	.06 @
Cotton fire hose.....	.02¾ @
Large hose .....	.02¼ @
Hard rubber scrap, No. 1, bright fracture.....	.27 @ .28
Battery jars (black compound).....	.03¾ @ .03¾
Insulated wire stripping.....	.04¾ @
Rubber heels .....	.04 @ .04½

* Nominal prices.

THE MARKET FOR CHEMICALS AND COMPOUNDING INGREDIENTS.

Copyright 1917.

NEW YORK.

JULY has been a dull month in the base metal market, with the uncertainty of the government's final policy as the chief disturbing factor. Should the one-price-to-all plan be adopted, present market values will undoubtedly experience radical changes. Under the present conditions it would be daring to buy except for immediate requirements. The leading producers have temporarily withdrawn from the market. Lead has been generally weak with prices showing a downward tendency, until the last week of the month when the market stiffened somewhat. That the government will soon require large quantities of this metal is firmly believed in trade centers. Spelter has shown weakness and prices have declined during the month, due to the question of government requirements and price regulations. Metal antimony has weakened in the face of small demand and prices have consequently declined. Aluminum has had but little call last month and prices are lower, No. 1 virgin metal, 98 to 99 per cent pure, being quoted 53 to 55 cents on July 25.

Business in rubber materials has been good for the month just passed. The volume of supply, while far from normal, has appeared to equal the demand. The market has not been affected by the periodic summer dullness, but on the contrary, conditions are brisk and buying active. The report that government specifications for inner tubes and airplane hose will include antimony sulphuret and heavy calcined magnesia has strengthened the market for these materials.

ACETONE. A steady demand and increased cost to producers has marked up the price of acetone about 3 cents a pound.

ALUMINUM FLAKE. Business has been good and deliveries on contracts regularly called for. Prices are unchanged and firm.

ANTIMONY SULPHURETS. The buying in this material has been quite active, and consumers have been freely anticipating their future requirements. Prices are the same as a month ago and market conditions firm.

CARBON BISULPHIDE. The call has been so insistent that some dealers are entirely sold up. Prices have advanced and 7 to 7½ cents are the present quotations.

CARNAUBA WAX. This has been requisitioned by the British Government, all stocks over two tons have been seized and no further dealings in this material will be permitted without a license.

DRY COLORS. Active demand has featured the color market. Bright red oxide, ultramarine and cobalt blue have received particular attention from consumers. Prices are firm and show an upward tendency.

LEAD PIGMENTS. These have been steady and unchanged by the lower prices of pig lead. Producers are waiting the government's decision as to quantity required and price to be paid.

LITHOPONE. The market has been quiet, with consumers asking for contract deliveries without reserve. Prices are firm but unchanged.

RECLAIMED RUBBER. The call for supplies of this material has been urgent from all quarters, with the question of delivery taking precedence over price. Prospects are good for continued activity in this market for the balance of the year.

WHITING. The market continues strong, due to the fact that producers are entirely sold up. There is no tangible relief in sight and until the difficulties that prevent the arrival of the raw materials are removed there will be no change for the better.

ZINC OXIDE. While the demand for spot zinc oxide has been active, actual trading has been light, due to the high prices asked by holders of second-hand stocks and the reluctance on the part of consumers to pay 16 to 18 cents for spot zinc oxide. Contract deliveries have been regularly called for by the rubber trade.

NEW YORK QUOTATIONS

JULY 28, 1917.

Subject to change without notice.

Accelerene	lb.	2.63	7
Acetone (drums)	lb.	.33	60
Acetyl acetate, 10 per cent. (casks)	lb.	.08	108
alcohol, 95 per cent. (casks)	lb.	.57	40
cresylic (crude)	gal.	1.00	1.10
nitric, 36 degrees	lb.	.07	@
nitric, 66 degrees	lb.	.11	@
Aldehyde ammonia (crystals)	lb.	1.00	@
Aluminum flake (carloads, bbls.)	ton	24.00	@
(carloads, sacks)	ton	22.00	@
Ammonium carbonate, powdered	lb.	.12½	@
Antimony, crimson, sulphuret of (casks)	lb.	.45	@
crimson, "Mephisto" (casks)	lb.	.45	@
golden, sulphuret of (casks)	lb.	.50	@
golden, "Mephisto" (casks)	lb.	.25	@
golden, sulphuret, States brand, 16-17 per cent.	lb.	.30	@
red sulphuret, States brand	lb.	.26	@
vermillion sulphuret	lb.	.28	@
Asbestos (bags)	ton	.50	@
Asbestos (bags)	ton	21.50	@
Barium sulphate, precipitated	lb.	.35	@ 50.00
Baryte, pure white	ton	.04	@
off color	ton	3.10	@ 33.00
Benzol	ton	22.00	@ 23.00
Benzol, 90 per cent.	ton	80.00	@
Beta-Naphthol	lb.	.55	@ .60
Brown oxide of iron	lb.	.55	@ .60
sienna, raw and burnt	lb.	.70	@ .75
umber, raw and burnt	lb.	.01½	@ .02
ochre, domestic	lb.	.05	@ .10
imported	lb.	.04½	@
Bone ash	lb.	.02	@ .03
black, powdered	lb.	.01	@ .04½
Cadmium tri-sulphate (f. o. b. London)	lb.	.06	@
sulphide, yellow	lb.	.05	@
Cantella gum	lb.	*2.68	@
Carbon, bisulphide (drums)	lb.	*2.25	@
black, fused	lb.	.38	@
tetrachloride (casks)	lb.	.06½	@ .07½
Caustic soda, 76 per cent.	lb.	.27	@ .35
Chalk, precipitated	lb.	.17	@ .18
China clay, domestic (powdered)	lb.	.06½	@ .06¾
imported (powdered)	lb.	.05	@ .05½
Chrome, green	ton	.04	@ .04½
yellow	ton	45.00	@ 25.00
Cobalt blue	lb.	.40	@
Cobalt oxide	lb.	.24	@
Cotton linters	lb.	.35	@ .50
Exceller	lb.	*.07½	@
Fossil flour	lb.	.85	@
Gas black (casks)	ton	60.00	@ 65.00
Gilsonite	lb.	.27	@ .35
Glue, bag grade	ton	40.00	@
medium	lb.	.40	@ .60
low grade	lb.	.30	@ .40
Glycerine, C. P. (drums)	lb.	.25	@ .28
Graphite, flake (400 pound bbl.)	lb.	.63	@
Green oxide of chromium (casks)	lb.	*.14	@
Ground glass (casks)	lb.	.06	@
Hexamethylene Tetramine (powdered)	lb.	.75	@
Indian red, reduced grades	lb.	.02½	@ .80
pure	lb.	.65	@ .08
Infusorial earth, powdered	ton	.10	@
belated	ton	60.00	@
Iron oxide, red, reduced grades	lb.	65.00	@
red, pure, bright	lb.	.04	@
red excelsior	lb.	.12	@ .16
Ivory, black	lb.	*.18	@
Lampblack	lb.	.16	@ .30
Lead, red oxide of	lb.	.14	@ .20
sublimed white	lb.	.13	@
white, basic carbonate	lb.	.11	@
white, fused phosphate	lb.	.11½	@ .11½
black hyposulphite (Black Hypo)	lb.	.11	@
Lime, flour	lb.	*.50	@
Litharge, domestic	lb.	.01	@ .01
English	lb.	.11½	@ .12½
sublimed	lb.	.13½	@ .14
Lithopone, uncolored	lb.	.13	@ .14
domestic	lb.	.13	@ .14
Beckton white (carloads)	lb.	.06½	@ .06¾
Magnesia, carbonate	lb.	*.06½	@
calcined	lb.	.20	@ .22
light	lb.	.14	@
Magnesite, calcined, powdered	ton	.70	@ .75
Mica, powdered	ton	40.00	@ 50.00
Mineral rubber	lb.	.03½	@ .05
"M. R. N."	ton	.03	@
"Glen"	ton	100.00	@
"Herc"	ton	.37	@
"Roh"	ton	1.00	@
"N. R. N."	ton	.13	@
"N. R. N. S."	ton	40.00	@
Naphtha	lb.	.24	@
oil, refined (Argo)	cwt.	.29	@
V. M. & P. (steel bbls.)	gal.	.30	@
oil, refined	lb.	.23	@
corn, refined (Argo)	cwt.	14.96	@
oil, refined	lb.	.16	@ .17½

The anticipation that the government would require a large part of the capacity of the tire fabric mills has not been realized. It was found inexpedient and too costly to operate tire fabric looms on the coarse product required by the government. In the absence of government business the tire fabric market has been quiet and a perceptible easiness in deliveries noticed during the past month. Prices have been generally firm and

According to preliminary statistics compiled by the Bureau

standard Egyptian building fabric, combed and carded, has advanced since our last report, due to the strong position of the raw material.

NEW YORK QUOTATIONS.

JULY 26, 1917.

Prices subject to change without notice.

Airplane and Balloon Fabrics:

Wamsutta, S. A. I. L. No. 1, 40-inch.....yard \$0.57 @
No. 4, 38½-inch..... .50 @

Wool Stockinettes—52-inch:

A—14-ounceyard 1.75 @
B—14-ounce 2.25 @
C—14-ounce 2.50 @

Cotton Stockinettes—52-inch:

D—14-ounceyard .85 @ .90
E—11½-ounce60 @ .65
F—14-ounce85 @ .90
G—8-ounce75 @ .80
H—11-ounce70 @ .85
I—9-ounce60 @ .65

Colors—white, black, blue, brown.

Knitabac Stockinettepound 1.60 @ 1.65

Tire Fabrics:

17¼-ounce Sea Island, combed.....square yard 1.60 @ 1.65
17¼-ounce Egyptian, combed..... 1.40 @ 1.45
17¼-ounce Egyptian, carded..... 1.35 @ 1.40
17¼-ounce Peelers, combed..... 1.10 @ 1.15
17¼-ounce Peelers, carded..... .85 @ .90

Sheeting:

40-inch 2.35-yardyard *.17 @ .17½
40-inch 2.50-yard *.17 @ .17½
40-inch 2.70-yard *.17 @ .17½
40-inch 2.85-yard *.17 @ .17½
40-inch 3.15-yard *.17 @ .17½

Osnaburgs:

40-inch 2.25-yardyard .18 @
40-inch 2.48-yard17 @
37½-in. 2.42-yard17½ @

Mechanical Ducks:

Hosepound .53 @
Belting53 @

Carriage Cloth Duck:

38-inch 2.00-yard enameling duck.....yard .27½ @
38-inch 1.74-yard31 @
72-inch 16.66 ounce54 @
72-inch 17.21 ounce55 @

Drills:

38-inch 2.00-yardyard .25 @
40-inch 2.47-yard20¼ @
52-inch 1.90 yard26¼ @
52-inch 1.95-yard26 @
60-inch 1.52-yard34¼ @

Imported Woolen Fabrics Specially Prepared for Rubberizing—Plain and Fancies:

63-in., 3¼ to 7½ ounces.....yard *.38 @ 1.55
36-inch, 2¼ to 5 ounces..... .35 @ .85

Imported Plaid Lining (Union and Cotton):

63-inch, 2 to 4 ounces.....yard *.35 @ .75
36-inch, 2 to 4 ounces..... .25 @ .50

Domestic Worsted Fabrics:

36-inch, 4¼ to 8 ounces.....yard .35 @ .65
Domestic Woven Plain Linings (Cotton):
36-inch, 3¼ to 5 ounces.....yard .10 @ .18

Raincoat Cloth (Cotton):

Bombazine 64 x 60 water repellent.....yard .15½ @
60 x 48 not water repellent..... .11½ @
Twill 64 x 7216½ @ .17
64 x 10221½ @ .25
Tweed25 @ .30
Tweed, printed10 @ .15
Plaids 60 x 4812½ @
56 x 4412¼ @
Surface prints 60 x 4813¼ @
64 x 6015 @
Repp19 @ .23¼

Burlaps:

32—7½-ounce100 yards 9.00 @
40—7½-ounce 10.10 @
40—8-ounce 10.25 @
40—10-ounce 13.50 @
40—10½-ounce 13.75 @
45—7½-ounce *.12.50 @ 12.60
45—8-ounce *.12.40 @ 12.60
45—9½-ounce *.15.15 @ 15.25
48—10-ounce *.16.75 @

* Nominal prices.

EGYPTIAN COTTON MOVEMENT.

FROM AUGUST 1, 1916, TO JUNE 20, 1917.

To—	1916-17.	1915-16.	1914-15.
Liverpool .....bales	201,764	206,579	199,135
Manchester	128,497	133,969	145,600
Total shipments to Great Britain.....	330,261	340,548	344,735
To—			
France .....27,735 }	38,056	59,818	48,856
Spain .....10,321 }			
Italy .....29,807 }	49,695	48,481	167,842
Switzerland .....19,888 }			
Russia	31,686	42,310	39,605
Greece	65	775	2,392
Total shipments to Continent.....	119,502	151,384	258,895
To—			
United States	120,731	192,795	157,646
India .....100 }			
Japan .....10,905 }	11,005	25,065	15,806
Total shipments to all parts.....	581,499	709,792	776,882
Total crop (interior gross weight), cantars*		4,726,518	6,473,726

* A cantar equals 98 pounds.

(Compiled by Davies, Benachi & Co., Liverpool.)

TIRE FABRICS

JENCKES SPINNING COMPANY

PAWTUCKET RHODE ISLAND

The Canadian Consolidated Rubber Co., Limited, has opened a branch in Lethbridge, Alberta, situated on the main line of the Canadian Pacific Railway. The new branch is housed in a modern, three-story brick block, 40 by 90 feet, equipped with elevator service. A. Parks is the manager.



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AUGUST 1, 1917

No. 5

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Vol. LVI. No. 6.

SEPTEMBER 1, 1917

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Published on the 1st of each month by

THE INDIA RUBBER PUBLISHING CO.

No. 25 West 45th Street, New York.

Telephone—Bryant 2576.

CABLE ADDRESS: IRWORLD, NEW YORK.

HENRY C. PEARSON, Editor

Vol. 56. SEPTEMBER 1, 1917 No. 6

SUBSCRIPTIONS: \$3.00 per year, \$1.75 for six months, postpaid, for the United States and dependencies and Mexico. To the Dominion of Canada and all other countries, \$3.50 (or equivalent funds) per year, postpaid.

ADVERTISING: Rates will be made known on application.

REMITTANCES: Should always be made by bank draft, Post Office or Express money order on New York, payable to THE INDIA RUBBER PUBLISHING COMPANY. Remittances for foreign subscriptions should be sent by International Postal Order, payable as above.

DISCONTINUANCES: Yearly orders for subscriptions and advertising are regarded as permanent, and after the first twelve months they will be discontinued only at the request of the subscriber or advertiser. Bills are rendered promptly at the beginning of each period, and thereby our patrons have due notice of continuance.

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Entered at the New York postoffice as mail matter of the second class.

TABLE OF CONTENTS ON LAST PAGE OF READING.**THAT TIRED FEELING.**

INDUSTRIAL fatigue in factory workers has been investigated very thoroughly in the last few years and the results should be of the greatest value to manufacturers. Leading investigators have been Professor A. F. Stanley Kent, M. A., D. Sc., of the University of Bristol, England; Professor Ernest G. Martin, Leland Stanford University; Professor Lombard, University of Michigan, together with French and Italian scientists. The tests prove, briefly, that overtime reduces production, that eight hours' labor produces more than twelve hours, and that Sunday work cuts down production. It is only fair to state that most of the great American factories are operated on eight-hour shifts, and that there is no Sunday work. There are still some factories that believe in long hours and bet on overtime, but they are growing beautifully less as time goes on, not from philanthropic but from business reasons.

PROFITEERING MUST CEASE.

THE indications that certain American producers will, apparently, fight the plans of the War Industries Board to have them sell war supplies to the allied governments at the same prices charged the United States set one to wondering what sort of American citizens such men can be—not patriots surely. America entered the war with noble purpose and in the spirit of an humanitarian duty to perform; every good citizen shared that opinion. The whole people is tired of price extortion at home, and now that the Allied cause is ours also the feeling of the majority regarding profiteering on war supplies going overseas has undergone a distinct change.

President Wilson voiced popular sentiment in a recent address when he said: "Patriotism leaves profits out of the question. In these days of our supreme trial, when we are sending hundreds of thousands of our young men across the seas to serve a great cause, no true man who stays behind to work for them and sustain them by his labor will ask himself what he is personally going to make out of that labor."

No argument should be necessary on the principle that as there is now a common purpose among the nations fighting for world democracy, and since the Allies are buying their supplies with American money, justice requires that costs be equalized. Reasonable profits sufficient to sustain American industry must be assured, but exorbitant profits all out of proportion to the cost of production cannot longer be tolerated.

Evidence accumulates to indicate that the war is quite as likely to be brought to a close by the economic collapse of Germany as by an Allied victory on the battlefield. America is already heavily financing the Allied nations, and in conserving their economic strength she conserves her own and hastens the coming of peace. Fair prices must obtain even though government price regulation and further legislation have to be resorted to in order to accomplish the desired end. Happily no act of the rubber industry has given cause to believe such extreme measures will become necessary. May other lines of manufacture emulate its unselfish example.

CORD TIRES UNDER FIRE.

IT has been demonstrated that pneumatic tires are not likely to be punctured by flying bullets, and that their use is practical for officers' and other light military cars when under fire. Cord tires running at the rate of ten miles an hour were subjected to rifle fire at 50 yards. Eleven shots struck, but either failed to enter the tires, followed the fabric to the rim and there emerged, or remained between rubber and fabric or between rim and inner tube. In no instance was the tube punctured, although a twelfth shot, fired squarely into the tread with the wheel standing still perforated casing, inner tube, rim, three-eighths-inch iron felly and shattered itself on the iron protecting plate of the wheel.

The result is attributable to the movement of the wheel, the deflecting angles at which the shots were fired, and the resiliency and flexibility of cord tire construction. Henceforth, the speed maniac will cease to fear the town constable who commands him to stop or have his tires decorated like a Swiss cheese.

THE CALL FOR TRAINED RUBBER CHEMISTS.

IN rubber, as in every other manufacturing business, the call is now for the man who knows. Chemistry is the common foundation of all great commercial industries. The time is past when industrial chemists were regarded as mere drug clerks; their achievements in applied science have won for them a full appreciation of their value to the community. Already they hold high government positions, become officers in the army and navy, and directors of great manufacturing companies. Everywhere they have demonstrated the tremendous earning power of chemical research and scientific control which increase production, utilize waste, devise improved methods and invent new products.

Twenty years ago a chemist with difficulty obtained employment in a rubber mill, and only within a very few years have rubber chemists been accorded the recognition they deserve. But the progress they have made during the past year in accelerators alone demonstrates the value of specialization and makes it certain that rubber manufacturers will lean upon them heavily in future. There is still much to be learned about this subject, about vulcanization, coagulants for rubber latex, accelerated aging tests, rubber compounds for special purposes, and many other important matters which rubber chemists must be depended upon to discover. Indeed, every rubber manufacturer now has his chemist, and several of the larger firms maintain research laboratories manned by a large corps of trained experts.

It is an encouraging sign of the times that men are being specially educated for such work in several lines. As has long been the case in Germany, the technical schools of America are at last awakening to our needs in applied science and beginning to cooperate with leading industries with an enthusiasm that promises splendid future results. At the Massachusetts Institute of Technology a new plan for cooperative education and research which is far reaching in scope has been put into operation. A five-year course in chemical engineering leading to an advanced degree has been inaugurated in connection with a School of Chemical Engineering Practice. At the plants of five large manufacturing companies, representing widely different fields of chemical engineering activity, the institute maintains a well-equipped station for instruction and research. Thus each company provides its plant as a working chemical engineering laboratory

for instructional purposes and the institute reciprocates with a research organization devoted exclusively to the specific needs of the company. In this manner a real cooperation for a common good is attained; the factory experience is invaluable to students, while the research facilities of the institute greatly benefit the company in solving its manifold technical problems. Such a combination of fundamental science with its immediate application cannot fail to produce the sort of men that rubber and other industries will henceforth find themselves much in need of. It is to be hoped that this course will soon embrace the rubber industry.

THE RUBBER SECTION MEETING AT BOSTON.

RUBBER chemists are busy as never before. They have many problems of common interest to solve quickly and well, and appreciate the need of discussion and comparison of ideas. The program for the annual meeting of the Rubber Section of the American Chemical Society at Boston early in September has been arranged with these thoughts in mind, and all indications point to an exceptionally large gathering of leading chemists from all sections of the country seeking the benefit of common council for their country and their companies.

THE GREAT PATRIOTIC BUSINESS CONVENTION.

THE great business convention to be held at Atlantic City, September 17-21, under the auspices of the Chamber of Commerce of the United States, promises to be the most notable gathering of commercial leaders that this country has ever seen.

How business, big and little, can come to the help of the country and of the world is what the convention will try to find out. It is a fine, practical conception and will result in great good.

WHAT FIRE ELIMINATION MIGHT ACCOMPLISH.

BECAUSE of the importance and variety of rubber goods among war munitions, fire precautions in rubber mills, as in other essential factories, will receive more than customary attention. What fire elimination might accomplish is quickly shown by government statistics. During the past ten calendar years fire losses in the United States have aggregated approximately \$2,000,000,000, the amount of the first Liberty Loan. The booklet, "Safeguarding Industry," with its directions for the prevention of fire, which has been issued by the National Board of Fire Underwriters with the indorsement of President Wilson, therefore deserves the thoughtful perusal of every manufacturer in rubber and allied lines. It emphasizes and illustrates the words of the President to the effect that "preventable fire is more than a private misfortune; it is a public dereliction."

What I Saw in the Philippines—III.

By the Editor of The India Rubber World.

Leaving Manila for the South—The Governor of Mindanao—On Board a Revenue Cutter—Sleeping, Eating and Living on Deck—The Beautiful Philippine Inland Sea—A Bit About Mindoro—The Chicago Plantation—Opon and Its Great Oil Factory—Dean Worcester at Home—Cebu—Visit from a German Propagandist—Visayan Laborers Board the Cutter—Something About This Type of Labor.

THIS being primarily a story of rubber hunting I shall, perhaps, be pardoned for postponing descriptions of Manila, Baguio *et al.*, as well as my thrilling adventures with calesas, carabaos, carromatas and other indigenous dangers. Nevertheless, I intend to return to them, for they should be chronicled for the benefit of those who follow.

The rubber lands of the Philippines really lie far to the south of Luzon, centering in and about the great island of Mindanao. I had long been in touch with a newspaper man in Zamboanga, the capital of that island, and through him had conceived a vast respect for Governor Carpenter, the present civil ruler. When, therefore, an influential American arranged for me to meet the governor, who was then in Manila, I was delighted. The meeting resulted in an invitation on the part of his excellency to visit the Southern Islands and to go on the revenue cutter "Mindanao," sailing the day following. I should say in explanation that the journey is a long one and rather difficult to negotiate. It is, of course, by water, the usual means of conveyance being the small inter-island boats that run at irregular intervals,

and that are crowded with natives and freight to a degree that must be seen to be appreciated. There are, to be sure, the government transports, but unless one is in government service they are not available. Governor Carpenter's invitation was, therefore, eagerly accepted.

It was midnight when we went aboard, and within an hour we were quietly steaming out of the harbor and headed south. Even if it was a governor's boat it was crowded.



LEAVING THE HARBOR.

Six of us shared one tiny stateroom; not to sleep in, however. It was simply a dressing room, from which, pajama-clad, we emerged, climbed to the main deck and bestowed ourselves on cots. Of the six were a young architect from Boston in charge of Philippine public buildings, a lieutenant of constabulary on his way to Tawi-tawi, the superintendent of schools of Mindanao, and two Davao planters.

It was cool and comfortable on the windswept deck, and one clutched the blanket tight and slept, awakening every now and then to grab the clothes that the breeze had almost succeeded in blowing away.

Breakfast was served on the after deck at a long table at one end of which sat the governor, and at the other the alert captain of the steamer, while between were the passengers or guests, seven Americans, a couple of native priests and several Filipino officials. It was a very friendly and jolly company, and the fare, prepared and served by Chinese stewards, was excellent.

The captain was a young, athletic Californian, the only American left in inter-island service, and he was without

exception the most expert handler of a steam vessel that I have ever seen. When others would stop 50 feet from a pier and warp in, he ran boldly in, set the boat's nose against the quay so gently that the shock would not crack an egg, and then swung into place without bump or splash. Or if a native boat was in his berth, he slipped in and gently but firmly edged it away.

Breakfast over, the panorama of sea and shore was enthralling. I have traversed Japan's "Inland



GOVERNOR CARPENTER AND SULTAN OF SULU IN FRONT OF GOVERNMENT BUILDING, ZAMBOANGA.

Sea" by day and by night several times, and freely concede its beauties, but after three trips through the inland sea of the Philippine Islands, I think the latter by far the more beautiful. The climate is such that one's time is spent on deck; indeed, in all of the small steamers, staterooms, though furnished with berths, are used only for dressing; all sleep, eat and live in the open.

The islands, big and little, are forest clad to the tops. Passing between them in bright sunlight over a sea rippled by gentle breezes, close to cloud-capped shores, glimpsing native settlements of Nipa houses, meeting fleets of fishing boats with their double bamboo outriggers, watching for and seeing flying fish, porpoises and an occasional huge sea turtle, interest is ever kept alive.

After leaving Manila and coasting down by the provinces of Cavite and Batangas, it is a good 12 hours to the entrance of the long Verde Island Passage between Luzon and the great forested island of Mindoro. Possibly the boat stops at the little cement pier at Calapan to send telegrams. If so, the picture of the native town fringing the shore of the great shallow bay is one not soon to be forgotten. Indeed, few see even as much as this of this sparsely settled island. If one really visits the island for scenery or sport, he takes a boat from Manila to Port Galera, which will some day be a show place of the islands. The



PARA SEEDLINGS, "CHICAGO" PLANTATION, MINDORO.



VIEW OF "CHICAGO" HEADQUARTERS, MINDORO.

scenery is marvelous, both on shore and beneath the waters of the crystal-clear sea. Here a glass-bottomed boat would disclose marine growths and brilliantly tinted fishes that far outclass those of the Bermudas or the Hawaiian Islands. There are no hotels, not even rest houses, but safe camping places and excellent sea bathing. This island is noted as the home of the timarao, a small and exceedingly wild carabao. It is sometimes killed by big-game hunters, and is a sport fully as arduous and dangerous as tiger hunting.

For those interested in rubber, it is a bit of a surprise to know that on this island, only 100 miles from Manila, is a *Hevea* plantation some six years old. It is situated but a few miles from Calapan, and is locally known as "Chicago." At the time of its beginnings the Americans in charge had little

money and no experience in rubber planting. They sowed the seeds thickly in rows, and let them come up as planted. The result was a growth that looked like bamboo, so tall and slender were the trees. Later, when they desired really to give them a chance, the experts said they were too large for transplanting. The head of the agricultural department in Manila, however,

advised digging trenches along the rows, to preserve laterals, and cutting off all but about two feet of the tap roots. This was done, and every tree not only lived, but grew amazingly. Some 3,000 were thus treated, and they are now ready to tap and apparently as well off as they could be in any part of the world.

A curious fact about this plantation is that it is so far untouched by typhoons, and likely to con-

tinue safe. This is undoubtedly due to its being in the shadow of Mt. Halcon and the range that it dominates, which form a very effective wind-break.

I met one of the owners of "Chicago" at the Golf Club at Caloocan. He is an attorney in Manila, and was not at all sure as to what the future of the plantation would be, as it seemed to him that so far Americans had taken but little interest in Philippine rubber. Should such interest develop he saw a future in it as a seed producer for those who planted, say in Mindanao. As the trees have already begun to seed abundantly, this is very far from being a dream.

An American friend long resident in the Philippines, and one who thoroughly believes in the future of *Hevea* there, was almost absurdly chagrined over this plantation. Said he:

"I wish a typhoon would wipe it out today! The danger is that this, which is really in the typhoon belt, because of its wind-break, will not be harmed. Taking it as an example, enthusiastic Americans will rush plantings into other places in the zone of big winds, where there are no barriers, and have their whole planting destroyed. Then they and others will



REPLANTED SEEDLINGS, "CHICAGO" PLANTATION, MINDORO.

claim that rubber cannot be safely grown here. Until rubber growing on a big scale is an accomplished fact, plantings in sections that are not ideal should be prohibited."

Curiously enough the nearer one gets to the country said to be swept by big winds, the less one hears of their alleged

destructiveness, and as for signs of destruction, they do not appear to be in evidence.

All day long and all of the night following we steamed through straits, sounds, seas, bays and bodies of water big and little, by islands tiny and huge, until we began to realize what the geographers meant when they said there were really more than 3,000 islands in the Philippines. Finally, on the afternoon of the second day, we passed through a narrow, picturesque strait between the islands Mactan and Cebu. On the first named is the modern plant of the Visayan Refining Co., a big coconut oil mill installed by Dean C. Worcester. Strung along the shore are, first, the great oil factory, with its storage tanks and the bungalows of the resident officers, and, separated from plant and bungalows by a tiny creek, the village of Opon. This last named consists of one long street bordered by Nipa huts terminating in a plaza with market, ancient cathedral and a flourishing native school.

In visiting the plant one is impressed by the industry and alertness of the native workman. Only the chiefs of departments are Americans, the mass of workmen being Filipinos. In the village the people look healthy, well fed and contented, and show themselves to be exceedingly courteous. The great factory itself is the last word in intelligent equipment and arrangement for economical and efficient production.

Dean Worcester's house is, perhaps, the most roomy and best designed tropical house in existence. Situated so that the monsoons can sweep through every room, with broad verandas completely encircling it, finished in beautiful native woods, it is simple, homelike and elegant. Nor is it cumbered and cluttered with trite curios. There are a few rare ones, but each has

inspiring. Tropical nature has indeed favored this lovely spot.

The most picturesque and interesting feature, however, is the head of the home. As one who was in "at the beginning," who hob-nobbed with head hunters, traveled where white men had never gone before, organizing, pacifying, botanizing, observing, he is one of the commanding figures in that part of the world. The most marvelous part of his career, however, is that, dropping state work, he should enter the field of manufacture and install successfully a great industry among alien, and to a degree hostile, people, and do it to their benefit and his.

It is some seven miles from Dean Worcester's plant to the city of Cebu on the great island of Cebu. This city is noted as being one of the oldest in the islands. It looks even older than that. We were hardly fast to the big stone quay—American made—when a young German came aboard with a word of introduction wired by friends in Manila. He was interested in a rubber plantation further south, and told me all about it, how to reach it and so on. While we were chatting one of the Americans strolled up and stood looking intently and I thought eying him very searchingly. Later, the German having departed, the American said,

"Did X say why he took such long journeys into the interior from time to time?"

"No, what's the answer," I replied.

"I don't know yet, but it will all come out in time."

And it did. With the declaration of war by the United States the young German was at once locked up. It seems he had lists of former insurrectos and had been visiting them secretly, giving them \$5 a head and arranging for a general rising against the Americans. The insurrectos accepted the cash and were profuse



TYPICAL NATIVE VILLAGE WATERFRONT.



DEAN WORCESTER'S GREAT OIL MILL AT OPON.

either some definite use or a historic or intrinsic value that earns it a place in such a home.

The situation of the house is such that in any direction there stretches a panorama of sea, shore, coconut grove, native village and picturesque mountain. Added to this are cloud effects seldom equaled, which, with the brilliant blues and greens in the waterways, make a whole that is ever changing and always

in promises, but when the time came not one insurrected. Nevertheless, the American men resident there who had entertained him at their homes, and admitted him to their clubs will not soon forget that he tried to bring about destruction of their property and perhaps a massacre of their wives and children.

I had heard so much of the impossibility of getting laborers in the Philippines that when some 70 jolly, tough little Visayans

swarmed aboard at Cebu and overran all of the lower deck, I began to ask questions.

"Good workers? Sure," said the planter to whom they were consigned. "Better than Chinamen. We pay their passage down and they work, say, for a season or for a year, and then go home. In that lot are 20 old hands. The rest are new recruits. Labor scarce? I should worry! Aren't we shipping lots of these same Visayans to Hawaii to work on the sugar plantations there?"

"Do you have trouble with them?" I asked.

"Some. That little clerical-looking chap art is an agitator. He is from Manila and is down here to start trouble. When we come to my pier he will make impassioned speeches and try to get the men on a strike. His stunt will be to yell, 'You have been deceived! Do not get off the boat.' It will appeal to some of them, but my 20 old hands, who want the work and who know they are well treated, will pull the other way and we don't lose many of them, if any."

The laborers are easily managed, but are very like children, and the employer needs to be not only just, but tactful and exceedingly patient.



FILIPINO FISHING BOAT.

lengthy descriptions of symptoms. During this recital the uncovering of the wound is abandoned, for one must perforce use convincing and appropriate gestures. Then, too, the narrator becomes so enthralled with his tale of suffering that he forgets the wound and abandons himself to a perfect orgy of painful experience and self pity. When at last a tiny scratch is uncovered, gravely examined and gingerly touched with carbolated

vaseline, the cure is complete and the man goes back to work wholly satisfied.

If, however, the employer refuses to consider and treat the scratch and brusquely sends the man away, he is likely to spoil an otherwise competent laborer. The man will depart grumbling, his sense of injury will grow and he will continue troubled, half sick and wholly useless.

(To be continued.)



FREIGHTER LOADING COCONUT OIL AT OPON.

states, territories, foreign countries and provinces. The compensation principle and constitutional questions involved are reviewed, and special emphasis is laid upon the lack of uniformity in state laws and the inconsistencies growing out of their interpretation. An exclusively compulsory compen-

sation system is advocated throughout the country to be substitutional for and not supplemental to employer's liability, claims to be settled directly between employer and employee conditioned by adequate safeguards for the protection of the latter. The compilation, under expert guidance, of a permanent, scientific, uniform system of accident data, compensation statistics and judicial decisions, it is stated, would go a long way toward establishing definite insurable standards of liability and of equitable premium rates. The full report is obtainable at \$1 per copy postpaid.

WORKMEN'S COMPENSATION ACTS.

The National Industrial Conference Board, Boston, Massachusetts, composed of representatives of 16 national industrial associations, including The Rubber Association of America, has published an eight-page summary of the Board's report on the legal phase of Workmen's Compensation Acts in the United States. The history of such laws is outlined briefly, supplemented by tables showing when they were enacted by the different



THE "MINDANAO" ON THE BEACH.

Automobile Tire Fabrics.

By Alvin Kingsbacher.

THE bigness of this subject lies not only in its possibilities, but in its very realities. The present-day application of tire fabric to industry and to society is enormous and one may naturally but wrongly infer that a greater development is likely to result from the present unprecedented demand for it.

I am prepared to contradict the belief—widely current, generally accepted and apparently supported by fact—that tire fabric is in its experimental stage. There have been so many innovations attempted, such as the substitution of ramie for cotton, the twisting of a wire with the component cotton threads of the yarn and the experimentation with other than plain weaves, such as leno and similiar ones, that the failure of all these has not only removed the possibility of further development in tire fabric but has reflected greater merit on its present qualities and construction. In mentioning these various experiments it may be well to make evident in a brief manner the cause of their failures.

The substitution of a stronger material for cotton has necessitated the introduction of a fiber which has not the necessary properties of elasticity and flexibility. Any increase in strength

without these qualities would not be considered an improvement, but rather a detriment. In twisting wire with cotton threads the difficulty encountered is to secure a wire of such a material as will possess the same elasticity as the cotton. Another feature of this construction is that the wire will tend to cut the cotton or other fibrous material.

In using leno or other weaves which, by crossing the threads, yield a stronger

fabric, the objection arises from the cutting action of the threads. The effect of tire service on a fabric is so peculiar that it would not be long before the threads would cut each other in the places where they cross. From these observations of what has already been tried, it is natural to suppose that tire fabric has long since ceased to be an experiment. It stands to-day as a scientific certainty and is as much a standard commodity as army duck or any such similar fabric.

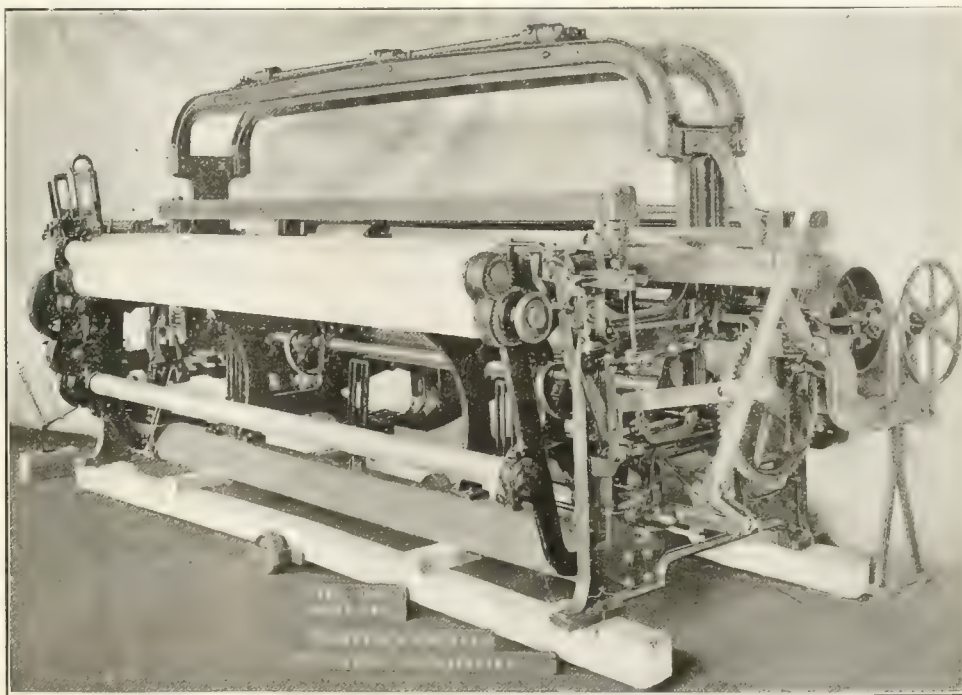
It is not my intention, nor have I the ability, to expound the theories of tire manufacture. My experience has been gleaned, firstly, in a cotton mill running exclusively on tire fabric, and secondly, in a tire factory as fabric analyst. It is my desire to combine these experiences in such a way as to give not only a fair idea of how fabric is made, but also what is expected

of it by the manufacturer who endeavors to make a reliable tire.

The pneumatic automobile tire is a complex combination of fabric and rubber. It has been created like most other inventions to meet existing demands, and having arrived at its present efficient stage, has succeeded in establishing for itself a monopoly, opposed to which countless devices designed to supplant it have not even made an impression.

The name "automobile tire fabric" is generic. It includes many kinds of fabric which are used in the construction of a tire, but the most important of these and the one that is used in greatest quantity is the "building fabric." It is estimated that of this style alone about sixty million square yards are used annually. In addition to this building fabric there are various other fabrics that go into the making of a tire. These sundry fabrics include special construction, known as "chafing fabric," "breaker fabric" and others, such as "Osnaburghs," "sheetings" and "tapes." The last two are used more especially in the process of tire manufacture and are not an inherent part of the tire itself. Then there is another fabric called "thread" fabric that is frequently used in making certain types of beads.

Before approaching the subject of fabric construction, I wish to outline in a crude and desultory manner the various processes through which the fabric must go before it becomes part of a tire. When the fabric is received at the tire factory it is inspected by the proper officials, and of this I shall deal at greater length later, but in this connection it is well to state that not all tire factories maintain a de-



A MODERN TIRE FABRIC LOOM.

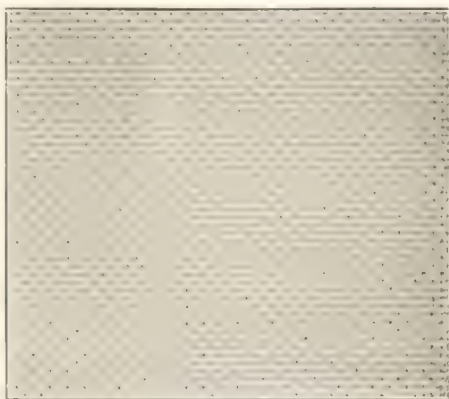
partment of this kind. It is to the credit of a few that they do maintain this department. It bespeaks a high standard of quality, and the rigidness and thoroughness of inspection in regard to fabrics betokens a similar care and exactness in the selection of other materials and in the various processes of the manufacture.

After the inspection comes the drying process. The fabric is run over hot rolls and all the moisture extracted, as it is essential that the fabric be dry before it is coated with rubber. The "calendering" or "frictioning" process is the means of forcing the rubber compound into and onto the fabric. The spaces or "pores" in the fabric are filled with rubber and then the fabric is "skimmed" or coated with a layer of rubber. The fabric is then ready to be cut into strips, the cutting being on a 45-degree

angle in order to secure a greater strength and to prevent the unraveling of the threads in the strips. These strips, in various plies, depending on the size of the tire, are finally built up on a mold or iron core to form the fabric for the tire.

BUILDING FABRIC

The "building fabric," as previously mentioned, is the body of the tire. It is the most important fabric and as such must possess above all, strength, flexibility and elasticity. The fabric is a plain weave, and weighs approximately 17.25 ounces to the square yard. The yarns from which this building fabric is made are 11/22.5 or 11/23. The twist in the single yarn



BUILDING FABRIC

is from 14 to 16 and the ply yarn is 4 to 5 turns per inch. The texture is 23 ends and 23 picks per inch. The gage of thickness of the fabric is .040 inch. The water content should not be over 5 per cent. The take-up is found to be about 14 per cent and the contraction of filling about 10 per cent, leaving normally a difference of 4 per cent in the amount of warp and filling yarn stretch. This is an important point in the construction of tire fabric. It is obvious that if the difference is too great, the filling, when the fabric is subjected to a strain, will arrive at its straight length before the warp and consequently will weaken or break before the straight length of the warp is reached. When the percentages of crimp or bend in the warp and filling are about equal, or within 5 per cent of each other, the warp and filling will tend to reinforce each other. In my capacity as fabric inspector I have analyzed so-called tire fabrics which had 32 per cent take-up in the warp and 7 per cent stretch in the filling. The difference of 25 per cent made them totally unfit for use in tires, although the fabrics were in every other respect perfect.

Building fabric is used in various grades, but the construction remains the same. Sakellaridis, or cotton grown in Egypt from Sea Island seeds, is a material that has become very prominent. The staple is longer and stronger than Sea Island, but is not quite so elastic. In color it is a yellowish white, a compromise between Sea Island and Egyptian. Long staple Sea Island, Combed Egyptian and Carded Egyptian are also used in great quantity, chief and most important of which is Sea Island.



CHAFING FABRIC

Strength obviously is the paramount feature in a tire fabric and upon this factor there cannot be put too much emphasis. Every tire manufacturer, even though he has no fabric inspection department, has at least a tensile strength testing machine. There are various ways of testing, and each method results in a different standard of strength. For example, breaking a 3-inch strip in a 2-inch jaw is virtually

testing two inches of fabric, but will yield a higher strength test than if just two inches are tested. This is because the two inches in the former case are reinforced by the threads adjacent, although not held in the jaws of the machine. The standard of strengths, as stated below, is based on a different method of testing and yields a lower but truer breaking strength. A piece of fabric is unraveled down to one inch, representing in number of threads the exact texture of that inch. This strip of fabric is placed in the jaws and tested for strength, and can indicate no greater strength than the exact number of threads that inch actually possesses. According to this method of testing the following standard for strength in building fabric is obtained:

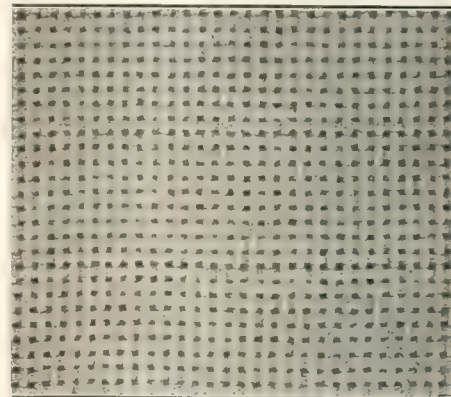
	Warp	Filling
Sakellaridis .....pounds	340	360
Sea Island	319	320
Combed Egyptian	275	285
Carded Egyptian	260	270

A question may arise as to the cause of the difference in warp and filling strength. When it is remembered that the warp is woven under considerable tension, this difference in strength is readily understood.

BREAKER FABRIC

The breaker fabric is applied on the tire just beneath the tread and its purpose is to protect the building fabric and to distribute the shock that the tire necessarily receives on the road over as great a surface as possible. There are many and varied constructions of breaker fabric, each manufacturer having his own particular weave and construction.

The average breaker fabric, if such there be, is somewhat similar in construction to the building fabric in respect to the yarns. The



BREAKER FABRIC, SQUARE WEAVE

texture is very much lower in order to permit large openings in the fabric to accommodate more rubber than the other fabrics. The weight varies, of course, with the construction, but usually is somewhere around 10 ounces to the square yard. Twelve ends and thirteen picks per inch give the necessary openness to the fabric. The weave will vary anywhere from a plain weave to a mock leno. It is made of Sea Island, Combed Egyptian or Carded Egyptian. It is difficult to set a strength standard for this fabric, as any change in texture, weave or yarns will greatly modify any standard which may be placed upon it. However, with a construction such as is outlined above the breaking strength would be as follows:

	Warp	Filling
Sea Island .....pounds	160	180
Combed Egyptian	140	155
Carded Egyptian	115	130

CHAFING FABRIC

The chafing fabric is used on the side walls of the tire where more flexibility is required, and is of necessity a lighter fabric. It is a plain weave weighing 9 ounces to the square yard. The yarns are 4/22.5 or 4/23. The gage or thickness is .022. There are 34 ends and 34 picks to the inch. It is made of Sea Island or Combed Egyptian and the breaking strengths are as follows:

	Warp	Filling
Sea Island .....pounds	155	170
Combed Egyptian	125	140

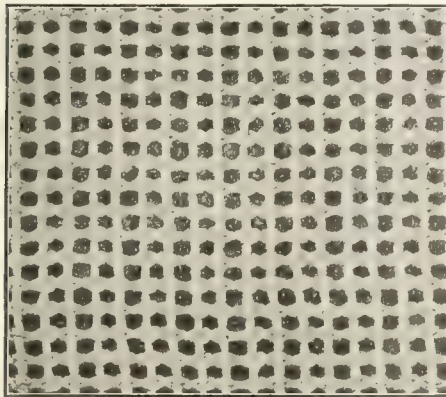
The other fabrics, Osnaburgs, sheetings and tapes, need no particular mention, as they are standardized fabrics and differ in no respect from the fabrics that are on the market today.

Before discussing the inspection of the tire fabric, I want to touch upon some of the precautions that are taken in the mill in order to turn out a perfect fabric.

SPINNING, WEAVING AND FINISHING.

The spinning of the yarns is, of course, an important step in the work, and it follows that unless the maximum strength of the cotton is secured here the succeeding process of manufacture cannot yield a suitable tire fabric. The twisting of the single yarn into ply yarn is not such a simple problem as it appears. When 11 single threads are twisted into one there is always a possibility of one or more threads breaking and the twisted yarn continuing in its whirly course with a fewer number of component threads than the requirements demand. This feature is known as "dropped ends" and is a serious weakness when found in the fabric. It is absolutely essential that every piece of yarn should have its required number of component threads through its entire length; and to twist it with this un-failing accuracy involves the human element more than the mechanical, as the result depends largely upon the skill and alertness of the operatives. Throughout the entire handling of the yarns, warp and fabric, there must be avoided any contact with oil, dirt or grease. Rubber will not adhere to an oily or greasy fabric and the tire manufacturer is very particular in re-

gard to the cleanliness of the fabric which he buys. The mill runs its looms on all grades of yarn separately. A weaver may be running one loom on Sea Island and another on Egyptian and may inadvertently mix the bobbins, weaving into a Sea Island fabric one or more bobbins of Egyptian yarn.



BREAKER FABRIC, LENO WEAVE.

Such a fabric is said to have "mixed filling" and is generally rejected by the fastidious fabric buyer. It is important that there be no broken or knotted threads. When a filling thread breaks, the pick is pulled out entirely and the loom started with a new pick in its proper shed. In the case of a warp thread the yarn is spliced; that is, two or three component threads are knotted at a time in different places so that the binding of the broken yarn does not make a bulky knot. There must be no holes in the fabric and everything about it must be even and uniform. After the weaving comes the mending, burling, mill inspection, finishing and packing. The fabric is rolled and wrapped with paper and burlap for shipping.

TESTING.

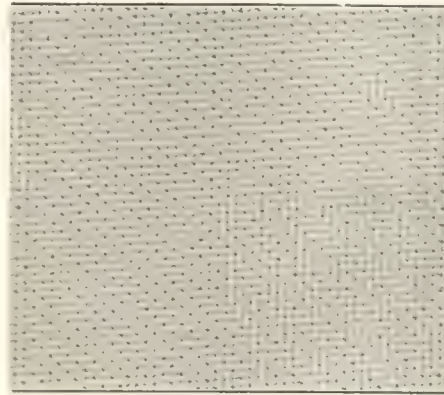
The fabric, being a plain weave and of heavy construction, appears to most persons as a very simple one, but this idea is abandoned when the number and diversity of tests which the fabric must undergo at the tire factory, is known. These tests may be divided into two classes; the physical and the visual inspections.

The physical tests include tests for strength, weight, thickness, or gage, texture, take-up, contraction of filling, and water content. When these physical tests are made and found satisfactory the fabric is run over an electrically lighted inspection perch. This is the visual inspection and by its means every defect or irregularity in the construction of the fabric becomes apparent. The irregularities that are looked for are as follows:

Loop Knots
Warp Knots
Beat Ups
Bad Start Ups
Uneven Fabric
Shed Change

Shed Warp Ends
Pulled in Selage
Reed Marks
Drop End Yarn
Split End Yarn
Oil Stains

Hard Twist Yarn
Soft Twist Yarn
Mixed Warp or Filling
Mispicks or Double Picks
Smashes
Flots



BEAD FABRIC.

While the presence of any one of these may not of itself constitute sufficient grounds for rejection, a combination of several of them or the frequent recurrence of one of them, would place the fabric in the imperfect class and render it unfit for use in tires.

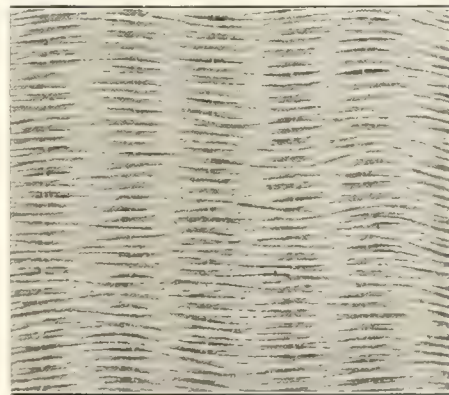
These strict specifications and

requirements for tire fabric give an idea of its importance in the building of tires. However, with increased knowledge of rubber compounds and tire construction, the importance of tire fabric may be in a measure reduced. These two need not necessarily conflict, as in its present form the pneumatic tire of to-day requires all the strength, flexibility and elasticity that can possibly be brought forth in a fabric.

COTTON TRADE NOTES.

THE Cookson Tire Fabric Co., Mansfield, Massachusetts, is being organized by Jos. H. Cookson, formerly superintendent of the Jenckes Spinning Co., Pawtucket, Rhode Island, who will have associated with him a group of local capitalists. A site has been secured, and contracts for machinery and equipment have been placed. The initial equipment is to consist of 40 cards, 7,000 spindles and 20 looms, with complementary machinery.

W. Irwin Bullard, treasurer of the Goodyear Cotton Mills, of Goodyear, Connecticut, and vice-president and general manager of E. H. Jacobs Manufacturing Co., is to be in charge of the textile department established by the Merchants National Bank, of Boston, Massachusetts.



BEAD THREAD FABRIC.

In many ways Goodyear, Connecticut, is developing rapidly as a result of its tire fabric mills. New machinery is being

installed which will increase the present weekly capacity of 100,000 pounds to 130,000 pounds. A new cotton storehouse with a capacity of 10,000 bales has been erected, and attractive modern cottages are being built along the lines of those at Good-year Heights, Akron, Ohio. A total of 88 has already been put up. Social as well as industrial progress is being manifested through the Goodyear Band, singing orchestra, motion picture theater and weekly community dances during the winter months.

War News of the Rubber Industry.

THE DRAFT IN RUBBER MILLS.

PROBABLY few industries have as large a percentage of young men of conscription age as are to be found in rubber mills. The prevalence of piece work is doubtless responsible for it. In Akron, "the rubber city," the majority of employees in the leading factories are between the ages of 21 and 31. From 10,000 to 12,000 Goodrich men are subject to call; 7,000 to 8,000 Goodyear men are similarly affected, likewise 4,000 to 6,000 Firestone men. While tire concerns such as these are particularly hard hit, they have taken a patriotic stand in claiming exemption for only a relatively few men who are extremely valuable to them, believing that in throwing their strength behind the present draft fewer men will be needed later.

The War Department startled rubber men by estimating Akron's population at 330,000, as against the 150,000 claimed by local authorities. A first draft of 2,200 men, based on that figure, will seriously hamper rubber mills, as even now it is difficult to obtain sufficient help to operate at full capacity.

At the outset it was believed that only a few hundred men in each factory would be affected by the first call and that many of them with wives and families would be exempted, but the high percentage of exemption claims throughout the country has resulted in a general relaxation of physical qualifications and the refusal of many local boards to exempt men with wives and children unless proof could be shown that they would suffer or become public charges. Rubber companies are, therefore, confronted with the immediate problem of filling many vacancies for the duration of the war. Girls and older men must be depended upon in most instances, especially the former, as a shortage of male labor exists in almost every industry. In Canada, England, France, Italy and Russia young women have bravely undertaken the work of men, and with the utmost success. In rubber manufacture they are to be found in every department except the milling room, and time may get the stronger women there too.

Although American women are no less willing or courageous, it is to be hoped that no dependents, perhaps physically unfit to withstand its rigors, will be forced into this work while thousands of unmarried alien men of military age and allied nationality escape service under any flag. While doing their best in men and industrial production for Uncle Sam, American rubber companies should stand firmly behind the principles of alien conscription and soldiers' insurance, that as few as need be of our wives, mothers and sisters be forced into factories, and that those who must make this or other sacrifices be assured a just reward should their loved ones be incapacitated or fail to return.

THE FAVORABLE SHIPPING OUTLOOK.

Importers of crude rubber and exporters of manufactured rubber goods find the present shipping outlook very heartening. Despite German submarine activities, statistics of the Department of Commerce show that our imports for the month of June broke all records by a large margin, and our exports exceeded those of any month except last January, while our total ocean-borne trade for the fiscal year ended June 30, was carried to a high level never dreamed of before the war, an increase of nearly 50 per cent over 1915.

During the past six months U-boats have sunk only a fraction of the tonnage predicted by German experts, and the under-sea fleet itself has suffered such losses that probably less than 200 submarines are now available for service. Arrivals and sailings at British, French and Italian ports are on the increase and neutral shipping is suffering less than formerly. On July 1

the British merchant marine comprised 18,000,000 tons of seaworthy ships of all kinds, and according to carefully compiled figures in the "London Times" Great Britain and the United States will in 1917 turn out a new ship tonnage in excess of that destroyed during the year, while in 1918 British and American shipyards will probably build no less than 8,000,000 tons of standardized cargo vessels.

Meanwhile, conditions will be improved by an arrangement nearing completion between Great Britain and the United States for joint control of the world's shipping. The Shipping Board is about to commandeer the entire American seagoing tonnage, not for government operation but for control of charters, direction of trade routes, priority of shipments and to lower freight rates so as to insure fair, rather than extortionate profits harmful to the allied cause. Our export embargo is bringing neutral shipping under United States control, both Norway and Holland having already offered to release virtually half their tonnage in return for food shipments, and the more recent embargo on iron and steel required for ship construction will bring the growing Japanese Pacific merchant fleet into Atlantic service. Apparently the complacency of rubber companies regarding their incoming and outgoing shipments is justified, and the complete elimination of the Goethals-Denman controversy lends a sense of added security.

THE AMERICAN AERIAL FLEET.

Absolute air supremacy is primarily responsible for recent allied gains on the western front. This supremacy must be maintained and increased despite Germany's feverishly hasty building program. That the United States will do its part and more in air service was assured when, late in July, the \$640,000,000 aviation bill became law, the largest single appropriation ever passed by Congress for one project.

Less than half this amount is to be expended in the purchase of airplanes alone. Personnel, training equipment, overseas maintenance, spare parts, flying stations, armament and scientific apparatus, all are to be provided for and are equally as important as the manufacture of the machines. One hundred and ten thousand officers and enlisted men—an army of the air greater than our standing army of a few months ago—will be needed. The whole project is one which appeals to the imagination of our people and to the genius of our American engineers, who, with the cooperation of the Society of Automotive Engineers, have worked out standardized types of fighting, reconnaissance and bombing airplanes for quantity production under the direction of Howard E. Coffin, chairman of the Aircraft Production Board of the Council of National Defense. More than 20,000 planes are to be built as a first increment and more will follow as needed.

THE WAR INDUSTRIES BOARD AND PRIORITY.

While the newly appointed War Industries Board represents a notable step forward and will doubtless accomplish much toward concerted action in production and distribution, it must necessarily labor under great difficulties in having no direct vested powers. Its functions, like those of the Council of National Defense, are merely to investigate and recommend, yet the executive and administrative departments of the government are lending it hearty support. Such matters as a general basis of prices on war materials for the government and the Allies, and priorities on government and allied contracts are already under consideration and a satisfactory conclusion may be anticipated.

It is expected that this board will eventually develop the need of an organization with all the powers of the British Ministry

of Munitions to minimize the disruption of normal business life by the war; to eliminate the harmful results of uncontrolled prices, and to prevent a breakdown in the distribution of the nation's output.

As a forecast of what may eventually develop in America, the workings of the Priority Branch under the British Ministry of Munitions are of interest to the rubber industry, because among the many industries affected are rubber trades and manufacture, including footwear; waterproofing of fabrics; manufacture of coal-tar and other chemical products; textile trades and manufacture and machinery.

The Priority Branch in England has for its function the bringing about of harmonious actions between the conflicting demands of the different departments of the Ministry of Munitions, of the Admiralty, the war and other government offices, the railroads, the mines and other quasi-public services and approved private industries, which are in more or less active competition for their share of raw materials, manufacturing capacity and labor.

The committee meets every day and no priority can be granted unless all present agree. One objection rejects an application—but this decision is not final. The representative of the interested department may withdraw the application and refer the matter through the chief of his department to some one representing the Minister of Munitions, who is the final authority.

A manufacturer instructed as to priority by the committee can himself issue certificates to bring about similar priority on materials of sub-contracts for his contract.

All persons engaged in certain industries have their work divided into three classes—*A*, *B* and *C*. *A* is war work, *B* other work of national importance, and *C* is all work not comprised in the other two.

Class *A* comprises work or material wholly required as a component part of any work or goods to be carried out or supplied under

(a) A government war contract which signifies: 1—Any contract placed by the Admiralty, the War Office or the Minister of Munitions; 2—Any contract for naval or military equipment placed by an allied government by or with the consent in writing of the Admiralty, the War Office, or the Minister of Munitions.

(b) Certified war work which signifies: 1—Work on a contract or order which the Admiralty, the War Office, or the Minister of Munitions has certified in writing to be war or munition work; 2—Work which the Minister of Munitions has directed to be treated on an equality with war work.

(c) Merchant shipping work certified in writing by the Board of Trade to be munitions work.

The priority branch grants priority in class as follows:

- 1—Most urgent war work.
- 2—Very urgent war work.
- 3—Urgent war work and
- 4—War work.

In addition there is an emergency classification which takes precedence over all.

The manufacturer is not compelled to accept work from the government and when a manufacturer accompanies an order to another manufacturer with a certificate which would entitle this order if accepted, to priority, the manufacturer to whom the order is tendered need not accept the order unless he desires to sell. There is, however, strong indirect pressure to accept priority orders because a priority order gives assurance that steel and other scarce raw materials may be secured, that transportation will be afforded, and also that a plant engaged upon priority work will have an adequate supply of labor.

The priority committee issues orders from time to time that no scarce material shall be used except on Class *A* work or Class *A* and *B* work.

Reports are required of all stocks in Great Britain of certain listed scarce material, and from time to time the Minister of Munitions takes possession of all stocks of certain character.

From time to time the priority branch requests of the manufacturer, a list of all of his orders, giving customer's name, and full particulars including what proportion of the work remains to be done.

WATERPROOF FABRICS FOR BALING ARMY STORES.

A new use has been found for waterproof fabrics. The Storage Committee of the Council of National Defense is urging all shippers to adopt every measure possible to minimize the need for railroad cars, and their use for storage purposes. The advantages of motor trucks for short hauls are being emphasized; likewise the importance of creating additional storage facilities at points of production to avoid congestion in manufacture, and at points of consumption that railroad cars may be unloaded promptly.

That every car may be loaded to its maximum capacity with the minimum of packing material, baling or compressed bulk packing is developing great possibilities for saving transportation space. The Quartermaster's Department of the army is already baling socks and blankets and satisfactory progress is being made toward baling uniforms, shoes and even prunes. The bales are covered with waterproof material which will later be used for sand bags at the front. Its use makes possible the employment of flat cars when box cars are not available.

It would seem that several articles of rubber manufacture would lend themselves to bulk packing, such as hospital and camp sheetings and blankets, waterproof fabrics for all purposes, leggings, ponchos and rubberized clothing of every sort, gas masks, rubber springs, gaskets, washers and valves, sponges, hot water bottles, ice bags and caps.

STYLE CONSERVATION.

The Commercial Economy Board of the Council of National Defense has recently recommended that manufacturers reduce the number of styles of their goods and that in place of elaborate, fancy styles the output should be confined as closely as possible to standards. The board has stated that in some lines this reduction could be as high as 25 to 50 per cent without inconvenience to customers.

As regards the rubber business, interviews with leading manufacturers show that, as a rule, they do not consider any great reduction of styles possible except with a resulting diminution of business. Take, for instance, tennis shoes: While the leading manufacturers do most of their business on three or four standard lines, there is a demand for finer goods on which the sales, in comparison, are few but, in the aggregate, many. With the leather shoe manufacturers putting a lot of style in their product the rubber shoe producers find there is a demand for similar "classy" shapes, with high heels and canvas tops, in rubber-soled footwear. The United States Rubber Co. endeavors to get out as few styles as possible with which to satisfy the demands of its customers and the public. It is the opinion of the sales manager that the proposition of the Economy Board is impracticable, as far as tennis goods are concerned.

Regarding rubber footwear, that is, overshoes of all kinds, the same conclusion holds. Rubber shoes must fit reasonably well the prevailing styles of leather footwear, and therefore the makers of overshoes must make a larger variety than if leather shoes were standardized.

In rubber and other waterproof clothing the action of the branch store managers at a meeting in Chicago early last month indicates the situation. These managers advocated a material reduction of models and styles to be introduced this season, and in consequence of this recommendation the company will feature standard models, patterns and styles, which make for economy and the best value for merchants and consumers, which decision is in accord with the company's policy of standardizing the raincoat business.

Among tire manufacturers the opinion is that something could be done, although this field for the practice of economy in styles, sizes, etc., is not so rich in opportunity as many others. The expensive equipment of cores, molds and machinery for tire making represents an outlay that could not be charged off in part without serious effect on the balance sheet. The tread types appear to be jealously guarded as part of the selling assets and the result of advertising expense that could hardly be dispensed with and meet competition. The tires are really known by their treads.

MANUFACTURE OF LEATHER SUBSTITUTES

When a peaceful nation like the United States goes to war the drain upon leather stocks is tremendous. For instance, in July the Quartermaster-General's Department awarded contracts for 2,175,000 pairs of marching and field shoes. Large quantities of saddles, harnesses, puttees and other articles, in whose manufacture leather is absolutely indispensable, are also being purchased. This sudden demand, in addition to the normal needs of the country, makes it necessary to conserve leather by employing other materials wherever possible. For several years American manufacturers have been turning out leather substitutes of the celluloid type, that have proved highly satisfactory for upholstery purposes, seat cushions, book binding and the like.

After exhaustive tests government officials have adopted certain grades for different purposes. The most important immediate use will be in ship upholstery, for which purpose its waterproof quality, freedom from mildew and mold are particularly important. It is uniform in thickness, strength and quality. It also saves the waste usually lost in cutting out imperfections and irregular edges of leather, as well as the expert labor necessary to do such cutting. Du Pont Fabrikoid is being manufactured in large quantities for the purpose.

MEDICAL RUBBER GOODS MANUFACTURERS

The government will require enormous amounts of surgical rubber goods, and to facilitate the placing and filling of orders the Medical Rubber Manufacturers' War Emergency Association has been formed. A. W. Warren, of the Hodgman Rubber Co., Tuckahoe, New York, is president; W. S. Davison, of The Miller Rubber Co., Akron, Ohio, is vice-president, and J. Russell Parker, of Parker-Stearns & Co., Brooklyn, New York, is secretary and treasurer. These gentlemen form the committee having for its object the purpose of mobilizing the manufactures of any or all lines of surgical rubber goods with the idea of taking care of the requirements of the Army, Navy, Red Cross, and possibly the Allies, during the continuance of the war. This committee is to obtain from each manufacturer data as to his capacity for producing any of the lines of merchandise required, samples of the merchandise itself, and the price at which they are prepared to supply it. All prices are presumed to be based on costs plus 10 per cent. This committee is acting as a sub-committee of the Committee of National Defense, and is supposed to transmit to headquarters its recommendations as to the quantity of goods to be allotted to each manufacturer and the price.

There are three sub-committees working in connection with this executive committee: one of which, with W. S. Davison as chairman, has charge of the orders of surgeons' gloves, catheters, colon and rectal tubes; the second, under chairmanship of A. W. Warren, will handle the requirements for rubber sheeting and rubber coated goods of all kinds; the third, under the chairmanship of J. Russell Parker, is devoted to hot water bottles, fountain syringes and goods of that character.

It is estimated that the manufacturers of these various lines who will cooperate in this movement have a combined capital of over \$100,000,000 and facilities for turning out these classes of goods in any desired quantity in a minimum time after receiving orders. Druggist's sundries of American manufacture have already established a reputation for reliability in Europe.

EMBARGO LIST EXTENDED

Supplementing the embargo proclamation of July 15, an account of which was published in the INDIA RUBBER WORLD, August 1, 1917, President Wilson has announced two lists of commodities which cannot be exported, except under special license, after August 30. One list prohibits practically every article of commerce being shipped from this country to enemy nations or to neutral countries of Europe. The second list, for which license is required for shipment to the Allies, their dependencies and the neutral countries of both continents, includes several additional chemicals, ingredients and materials not mentioned in the previous proclamation. As forecast in our previous account, cotton and cotton linters are now on the prohibitive list. Other commodities more or less important in the rubber industry are benzol and its derivatives, benzine, gasoline, ether, cottonseed oil, linseed oil, rapeseed oil, corn oil, glycerin, toluol, resin, turpentine, sulphur, acetone, ammonia and ammonia salts, sulphuric acid, nitric acid, white lead, lead, zinc, copper, plumbago. Copper wire and electrical equipment, electrical motor accessories, aeronautical machine parts and accessories are also included in this second prescribed list.

The regulations, orders, limitations and exceptions prescribed will be administered by and under the authority of the Exports Administrative Board from whom licenses in conformity with said regulations, orders, limitations and exceptions will issue.

CAPTAIN BUCKLETON AIDS RED CROSS.

Captain Ernest E. Buckleton, whose services as a soldier and as one of the first who hastened to the help of the suffering Belgians are well known, although unable to continue in active service at the front because of injuries sustained at the battle of Loos, is still at work for the Allies. In gaining money for the Red Cross and in talks to recruits at various American camps, he has done much. As we go to press word comes that, during a week-end at Orleans, Massachusetts, he reviewed and addressed the newly formed Home Guard. He also spoke for the Red Cross in the local theater, on Trench Warfare and the historic retreat from Mons to the Marne. Not only was the building filled, but hundreds were turned away. The collection for the Red Cross taken at that time amounted to \$125.

SERVICE PERSONALS.

Francis E. Drake, general European agent of the United States Rubber Co., has resigned that position to serve on the staff of General Pershing at the front in France.

Thomas F. O'Neil, advertising manager of the General Tire & Rubber Co., Akron, Ohio, has enlisted in the naval militia and is in training at Tarrytown, New York.

Frank R. Bacon, president of the Cutler-Hammer Manufacturing Co., Milwaukee, Wisconsin, has been called into service as a captain in the Federal commissary department.

C. V. McMillan, manager of the Wichita, Kansas, branch of The B. F. Goodrich Co., Akron, Ohio, has enlisted in the Kansas Field Artillery. N. A. Nelson succeeds him as local manager.

Sergeant P. F. Talley, a veteran of the Philippine and Boxer campaigns, has succeeded Lieutenant Walker in charge of the drill classes of The Goodyear Tire & Rubber Co., Akron, Ohio. Lieutenant Walker having been called to active service with the Ohio National Guard.

Frank Waldo, of the firm of E. M. & F. Waldo, 11 Broadway, New York city, has been selected as a candidate for appointment as an officer in the United States Army and has been directed to report at Plattsburg, New York, on August 25, where he will enlist for a period of three months for training purposes.

Second Lieutenant M. DeMott Letherman, of the United States Rubber Co., New York office, has sailed for France, with a party of American officers, to observe French trench tactics.

Walter H. Nolan, assistant manager, Springfield, Massachusetts, branch, The B. F. Goodrich Co., is at Plattsburg, New York.

COMPANY NOTES.

The United States Tire Co., New York City, has made extensive alterations in factory equipment for the manufacture of solid tires for Class A and B military trucks, according to the standard design worked out by the Motor Transport Board of the War Department with the cooperation of the Society of Automotive Engineers.

H. F. Davenport, secretary of the Brunswick-Balke-Collender Co., Chicago, Illinois, is prepared to demonstrate very graphically, in the form of an open letter to the trade, just what \$9,000,000,000 signifies, this being the amount the Secretary of the Treasury McAdoo states will be spent by the government and our allies within the United States during the next year.

Girls employed by The Fisk Rubber Co., Chicopee Falls, Massachusetts, are taking an active part in war activities. The Fisk Unit of the Volunteer Clerical Corps, which is helping the government with the vast amount of detail work incident to registration and other new enterprises of the war, has alphabetized and classified over 15,000 registration cards in western Massachusetts. Delegates have also been sent every evening to the Springfield Armory, an army service rifle manufacturing establishment, where greatly increased production requires much additional clerical work.

The Fisk girls are also active in Red Cross work, and as several Fisk men are in the Second Regiment, Massachusetts National Guard, an ambulance was presented to that regiment by the Fisk company.

The first woman motor truck driver in western, perhaps in all, Canada is Mrs. Eva Crane, who drives one of the delivery cars for the Winnipeg branch of the Dominion Rubber Sytsem. In her appropriate khaki suit Mrs. Crane loads and unloads her own car; gets her orders from the office; delivers goods to cus-



tomers and railways, and works beside the warehouse men in the shipping department. She asks and accepts no assistance other than is ordinarily accorded to a man on the job. Her work is entirely satisfactory and she is satisfied with her position. "I took the job," she said, "so that some healthy, physically fit man could go overseas and fight alongside my husband and brothers in the trenches."

The Rubber Trade Roll of Honor.

Reported by The Rubber Association of America

Numbers in parenthesis following individual names indicate branches of service as shown by the key list on page 708.

APSLEY RUBBER CO., HUDSON, MASSACHUSETTS.

MASSACHUSETTS NATIONAL GUARD.

Ralph P. Hopkins
Warren Leary
Edward Thomas
Edwin J. Hadlock
Paul Jones
Harold Matthews
Stephen MacLellan
Emil Dupont
Thomas Flannagan
Cecil Benway (39)
Harold Claflin (16)
Fred L. Parchert (16)
William Storey (2)

William G. Tenney
Michael F. Sullivan
Harry E. Hadlock
J. Raymond Hogan
Joseph Keitt
Frank McCarthy
Edwin F. Beavis
Charles Bages

Philip Bishop (8)
Jesse A. Gates (2)
Wallace Rixford (39)

BISHOP GUTTA-PERCHA CO., NEW YORK CITY.

Chester Prowdman (2)
Edgar Fessender (2)
Michael Latonne (2)

George Jolly (2)
Charles Haney (2)
John Plimst (33)

ESSEX RUBBER CO., INC., TRENTON, NEW JERSEY.

Gustave Fischer (4)
Edward Blydenberg (9)
George T. Oakley (7)
Frank Backes (15)

Alex Ryan (3)
Elmer Cross (6)
John Simcock (9)

HODGMAN RUBBER CO., TUCKAHOE, NEW YORK.

U. S. ARMY.

Frank Jozzi
Thos. Semenza
Louis Addinizio
Jerome Milik
G. Rivellini
G. Sacchi
Joseph Reed (2)
E. G. Beer (20)
Charles Sergeant (2)
S. Nusso (2)

Clarence Ruppert
Vincent Salemme
Romeo Florri
Frank Jocco
E. De Martini
J. Sartin
Joseph Grogan (2)
T. J. Harrigan (2)
F. H. Giffing (19)

HOOD RUBBER CO., WATERTOWN, MASSACHUSETTS.

FOREIGN SERVICE.

J. Dranjimetricu
H. Hohannesian
H. Markarian
Murdock Campbell
Francis Waldron

H. Sahogoni
I. McDonald
F. Zakarian
Paul Gormley

KATZENBACH & BULLOCK CO., NEW YORK CITY.

George A. Yoerger (19)

J. S. Ackerman (16)

L. & M. RUBBER CO., CARROLLTON, OHIO.

Harry Deets (3)
Earl Long (2)

Wayne Wiggins (3)

MANHATTAN RUBBER MANUFACTURING CO., PASSAIC, NEW JERSEY.

NEW JERSEY NATIONAL GUARD.

John Van Houten
R. A. Jackson
Wm. Handschul
John Bill
Richard Lullwitz
Richard M. Rush
John Hand
Dennis H. Keane
Wm. Morris
Jos. Libak
Timothy McNeill
Irving Mandeville
John Hootnik
Geo. Jones
Stanley Gaglansky
Albert Whitelaw
H. G. Wotherspoon (10)

A. T. Derron
Wm. Scott
John Czingili
Wm. Keav
Henry Gatti
Eugene Banker
John Stromach
Louis Servat
Harold Moseley
Steve Fristash
John Devlin
Albert Miller
Anthony Dennis, Jr.
John Borach
Louis Raymon
F. D. Ingalls (35)
Howard A. Herty (10)

MIDLAND TIRE & RUBBER CO., COSHOCTON, OHIO.

Archie Clark (1)
Fred Ralph (1)

Earl Dunbar (1)

MILLER RUBBER CO., AKRON, OHIO.

U. S. ARMY.

John F. Babbitt
John Rogers
Paul Pierce
C. H. Miller
Walter Vaughn
Froud Wargo
Theodore Colgate
Otto C. Shelpan
Geo. J. Bender
Elmer Spearing
Bixler Allen
John Keimel
Dan Kumerine
John Boslooper
R. Dennis
Jack O'Brien
Judge Layter
John McManus
Ben Favender
Alonzo Burk
Herbert Cook
Chas. Harmen
Stephen Sophis

H. J. Gewinner
George Bruner
Emmett Hickman
Floyd Dietrick
Charles Meinhardt
Frank Doudua
Ray Straub
F. W. Frankhauser
Percy Reid
Charles Hoag
I. C. Jump
Thomas A. Boulton
Lawrence Womer
John Isler
H. Zook
Garrett Cleafont
Arthur Posschl
F. Backnee
Frank Goddard
Walter Holder
Harvey Welton
Harvey Seedle
James Burris
E. C. Crawford

MISHAWAKA WOOLEN MANUFACTURING CO., MISHAWAKA,

INDIANA.

U. S. ARMY.

J. A. ...	Geo. H. ...
A. ...	M. Bekaert
N. ...	F. ...
C. ...	M. ...
G. ...	C. Auwenroyce
J. ...	F. ...
H. ...	W. ...
H. ...	C. Lynn
L. ...	Frank Decker
L. ...	Lawrence Bultinck
L. ...	H. Larnelle
E. ...	L. Lorois
G. ...	C. Roderick
A. ...	E. Nye
M. ...	R. Pittman
L. ...	W. Green
L. ...	F. Ozwick
Benj. Fetters	

COAST ARTILLERY CORPS.

S. Quick	A. Singer
W. Atkinson	A. Stetson
C. Foster	C. Rice
P. DeGroote	Rosco Warren
E. Stanley	Russell Hawkins
Ray Warniers (18)	Chas. Smith (18)
Calvin Dyer (18)	C. Verstraete (18)
C. Clifford Casper (24)	E. O. Bryant (24)
D. Bushman (4)	H. Brundage (4)
A. Woland (6)	H. Williams (6)
L. Holderman (5)	A. Roper (5)
Hardy Stebbins (5)	F. Stebbins (20)
John McNeill (20)	Glenn D. Babcock (20)
John Schmidt (2)	Harold E. Gardner (11)
Arthur ... (11)	Ralph J. Hutchinson (11)

NATIONAL TIRE & RUBBER CO., EAST PALESTINE, OHIO.

Robert Spaulding (15)	Ernest Mansel (37)
Oscar Erickson (37)	Harry Barnhouse (15)
Neil Crate (38)	Leroy Dodge (38)
Harry Garrique (15)	Charles Flowers

PACKARD ELECTRIC CO., WARREN, OHIO.

Clyde Green (37)	John Thornberg (37)
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PEARCE RUBBER CORP., PHILADELPHIA, PENNSYLVANIA.

George Copple	John Kennedy
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PORTER RUBBER CO., SALEM, OHIO.

Osborn Macetta (6)

PORTLAND RUBBER MILLS, PORTLAND, OREGON.

Glenn Nourse (40)	James Parker (40)
Eiler Erickson (40)	Fred Tomlinson (40)
Loren Sturgeon (1)	Christian Zents (1)
Alexander Robb (1)	Albert Hough (16)
G. C. Spokesfield (15)	Harold Smith (24)
Paul Reese (5)	

RUBBER INSULATED METALS CORP., PLAINFIELD, NEW JERSEY.

James Joyce (2)	Arthur Robinson (2)
Arthur John Morris (2)	

RUBBER REGENERATING CO., NAUGATUCK AND DERBY, CONNECTICUT, AND MISHAWAKA, INDIANA.

U. S. ARMY.

James Donfero	Clarence Warner
Omar Abraham	C. Broyles
F. Barrett	G. Cullers
A. Clark	A. Frase
Ben Davis	A. Hunt
F. Godfrey	Marvin Morris
C. Miars	H. Young
R. Robbins	Lloyd West
J. Wasser	

INDIANA NATIONAL GUARD.

R. Byer	S. Davis
F. Fifer	P. Genevecki
Ray Parks	R. Stiver
M. Zimmerman	
Edw. Doneth (2)	E. Hine (2)
R. Spencer (2)	S. H. Yoder (2)
P. P. Arthur (41)	D. J. Lautz (42)

SAFETY INSULATED WIRE & CABLE CO., NEW YORK CITY.

E. P. Benjamin (15)	H. A. Dearing (43)
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STANDARD FOUR TIRE CO., KEOKUK, IOWA.

D. H. Seeman (3)	Jack Weiss (14)
Lee Patterson (27)	Hernie Myers (72)
Ralph O'Blenness (3)	

STANDARD TIRE & RUBBER MANUFACTURING CO., CLEVELAND, OHIO.

Everett Swan	Carl Roberts
Clyde Glynn	John Wicker
Leo Scaglions	D. G. Hauscheer

STERLING TIRE CORP., RUTHERFORD, NEW JERSEY.

George T. Booth (15)	Maurice L. Lee (2)
Earl Lascallet (28)	John Dunn (3)
P. S. Jacobson (3)	Raymond Johnson (1)
A. O. Whyte (2)	Earl D. Brooke (2)
W. C. Brenner (1)	A. T. Fleming (33)

H. F. TAINTOR CO., NEW YORK CITY.

Starr Taintor (2)	Herbert T. Spooner (20)
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THERMOID RUBBER CO., TRENTON, NEW JERSEY.

U. S. NAVY.

Marvin Wood	J. J. Quigley
Philip Ashbrand	Fred Schilling
Charles Brown	Harry Wissmann
Raymond Koenig	
William Koons (12)	Charles Harding (12)
George Lavatsky (1)	James Murphy (1)
Ernest Hilton (1)	Stanley Voorhees (5)
Lawrence Dolan (5)	Joseph Williams (31)
Francis Apgar (31)	William McNeal (31)

UNITED STATES RUBBER CO., NEW YORK CITY.

W. H. Palmer (36)	H. J. Haefelein (36)
T. H. Young (5)	D. Gunn (19)
J. Huggard (2)	J. L. O'Toole (1)
A. Gallagher (2)	J. Foltz (16)
C. A. Bechtel (16)	F. P. Riley (11)
W. D. Jones (11)	P. M. Brown (25)
Herbert Lord (21)	O. P. Friend (21)
E. H. Wells (20)	John Henkle (11)
Irwin Hurst (1)	F. Sheridan (2)
Joseph Clause (3)	Robert Stuart (2)
Orson Parkenson (2)	Richard T. Robinson (1)
L. G. Truesdell (1)	J. F. Nelson (19)
B. I. Lemon (20)	Homer Steel (22)
L. P. Thomas, Jr. (23)	Arthur Gray (19)
Henry Trowbridge (17)	Edward W. Vaill (20)
I. B. L. Orme (20)	Louis C. Geils (32)
F. C. Batchellor (20)	B. I. Lemon (11)
M. G. Shepard (30)	T. W. Taneway (8)
D. A. Wilcox (11)	Joseph F. Schneider (20)
Edward R. Bartlett (20)	L. Horak (19)

WILSON TIRE & RUBBER CO., SPRINGFIELD, ILLINOIS.

C. H. Cook (2)	M. R. Rodger (26)
W. A. Rodger (26)	G. J. Murphy (26)
A. B. McCoy (18)	Jerry Grady (18)
Charles A. Campbell (18)	

KEY TO BRANCHES OF SERVICE.

1. U. S. Army.
2. U. S. Navy.
3. U. S. Marine Corps.
4. U. S. Aviation Corps.
5. U. S. Cavalry.
6. U. S. Field Artillery.
7. Coast Patrol.
8. Coast Artillery Corps.
9. Navy Department.
10. Quartermaster.
11. Quartermaster's Department.
12. Mosquito Fleet.
13. Foreign Service.
14. Electrical Engineer.
15. Hospital Corps.
16. Ambulance Corps.
17. American Ambulance Corps, France.
18. Medical Corps.
19. U. S. Naval Reserve Corps.
20. Officers' Reserve Corps.
21. Naval Coast Reserve.
22. U. S. Medical Reserve Corps.
23. Officers' Training Corps.
24. U. S. Engineers.
25. Harvard Regiment.
26. Illinois National Guard, Cavalry.
27. Iowa National Guard.
28. Maryland Naval Militia.
29. Massachusetts National Guard.
30. Engineers' Training Camp.
31. New Jersey National Guard.
32. New Jersey National Guard, Field Artillery.
33. New York National Guard.
34. New York National Guard, Cavalry.
35. New York National Guard, Engineers.
36. New York Veteran Corps of Artillery.
37. Ohio National Guard.
38. Pennsylvania National Guard.
39. Vermont National Guard.
40. Oregon National Guard.
41. French Colors.
42. Field Ordnance.
43. New York National Guard, Machine Gun Co.
44. New York National Guard, Hospital Corps.
45. Indiana National Guard.

Rene L. Robiquet, for some years with the London and Manas houses of Alden's Successors, Limited, who is fighting for his native land as a private in the 24th Regiment of Infantry of France, has won the *Croix de Guerre* "for great bravery in the field and devotion to duty." M. Robiquet married an Englishwoman, who, with their daughter, is living in England.

Bowers' Specific Gravity Tables.

IN the August issue of THE INDIA RUBBER WORLD the Bowers' table for computing the approximate weights of disks was published in full and also several samples were given to illustrate the method to be followed in making computations. The table for cylinders that follows is used in determining the weight of cylinders such as typewriter platens, tubes, bands, springs, tubing, made on a tubing machine or by hand, cylindrical coverings for shafts and paper mill rolls. The range of the table is from 1/64 inch to 3 inches for cylinders of customary measurements.

CYLINDER TABLE.

The stated base of the cylinder table is 62.4256 + pounds per cubic foot.

The unit used is .00133 ounce equals a cylinder 1/64 inch diameter, one foot long. Specific gravity 1.00.

$$.00132996 \text{ ounce} \times (12 \times 64)^2$$

$$= 62.4256 \text{ + pounds.}$$

$$.7853982 \times 16$$

Weight of one cubic foot of water 39.1 degrees F. (maximum density) = 62.425 pounds. (Kent, 1916 edition, page 27.)

To convert the cylinder table into weights according to above standard, multiply by 0.9999 + or divide by 1.00001 ±.

The cylinder table is constructed to read from 1/64 inch diameter up, in the same manner as the disk table:

1/64 inch to 3 inches by 64ths in ounces
1/32 inch to 6 inches by 32nds in ounces
1/16 inch to 12 inches by 16ths in pounds
1/8 inch to 24 inches by 8ths in pounds
et cetera

$$\frac{1}{2} \frac{1}{64} \text{ inch} = \frac{5.61925}{4} \text{ ounces}$$

$$\frac{2}{2} \frac{1}{32} \text{ inch} = \frac{22.47700}{4} \text{ ounces}$$

$$\frac{4}{2} \frac{1}{16} \text{ inch} = \frac{89.90800}{4} \text{ ounces} = \frac{5.61925}{4} \text{ pounds}$$

$$\frac{8}{2} \frac{1}{8} \text{ inch} = \frac{22.47700}{4} \text{ pounds}$$

$$\frac{16}{2} \frac{1}{4} \text{ inch} = \frac{89.90800}{4} \text{ pounds}$$

The variation between the weights of a cylinder one foot diameter, one foot long, specific gravity 1.00 determined from the disk or cylinder table is as follows:

$$\text{Cylinder table} \dots\dots\dots 49.029120000 \text{ pounds}$$

$$\text{Disk table} \dots\dots\dots 49.007296512 \text{ pounds}$$

$$\text{Difference} \dots\dots\dots 0.021823488 \text{ pounds}$$

The combined use of both the disk and cylinder tables in one calculation will be found convenient, practically accurate results will be obtained.

The volumes of two similar solids are to each other as the cubes of their linear dimensions. (Kent, 1916 edition, page 62.)

To determine the weights per gross of washers and kindred articles, the combined use of the following factors and the cylinder table will simplify the calculations:

$$\begin{array}{lcl} 144 \text{ disks one inch diameter} & = & 1 \text{ cylinder one inch diameter} \\ 1/64 \text{ inch thick} & = & 3 \frac{1}{16} \text{ foot long} \\ 1/32 \text{ inch thick} & = & \frac{3}{8} \text{ foot long} \\ 1/16 \text{ inch thick} & = & \frac{3}{4} \text{ foot long} \\ \frac{1}{8} \text{ inch thick} & = & 1 \frac{1}{2} \text{ feet long} \\ \frac{1}{4} \text{ inch thick} & = & 3 \text{ feet long} \\ & & \text{et cetera} \end{array}$$

SAMPLE.

Washers—1½ inch diameter, 1 inch hole, ¼ inch thick, Specific Gravity, 1.50.

$$\begin{array}{rcl} 1 \frac{1}{2} & = & 12.25728 \text{ ounces} \\ 1 & = & 5.44768 \end{array}$$

$$144 \times \frac{1}{4} \text{ inch} = 3 \text{ feet}$$

$$\begin{array}{r} 20.42880 \\ 1.50 \\ \hline 102144000 \\ 20428800 \end{array}$$

$$30.6432000 \text{ ounces per gross}$$

SAMPLE.

One gross 6 inch A. S. M. E. gaskets, 3 1/16 inch thick, Specific Gravity 1.62, 11 inch diameter, 6 inch hole, 8 7/8 inch bolt holes on 9 1/4 inch bolt circle—(Kent 1916 Edition, page 209).

COMPUTATION.

$$\begin{array}{rcl} 11 \text{ inch diameter} & = & 41.19808 \text{ pounds} \\ 6 \text{ inch hole} & = & 12.25728 \end{array}$$

$$\text{Less } 8 \frac{7}{8} \text{ inch bolt holes at } 26068 = 28.94080$$

$$= 2.08544$$

$$26.85536$$

$$144 \times 3/16 \text{ inch} = 2.25 \text{ feet}$$

$$13427180$$

$$5371072$$

$$5371072$$

$$604245100$$

$$1.62$$

$$1208490200$$

$$3625470600$$

$$604245100$$

$$97.887706200 \text{ or } 97 \frac{7}{8} \text{ pounds per gross}$$

SAMPLE.

Tubing—3 1/16 inch hole, 1 1/16 inch wall, Specific Gravity 1.83.

COMPUTATION.

$$\begin{array}{rcl} 5/16 \text{ inch} & = & .53200 \text{ ounces} \\ 3/16 \text{ inch} & = & .19152 \end{array}$$

$$.34048$$

$$1.83$$

$$102144$$

$$272384$$

$$34048$$

$$6230784 \text{ ounces}$$

$$\text{or } 4 \text{ pounds light per } 100 \text{ feet}$$

SAMPLE.

Cylinder—6 inch diameter, 5 inch hole, Specific Gravity, 1.68.

COMPUTATION.

$$\begin{array}{rcl} 6 \text{ inch} & = & 12.25728 \text{ pounds} \\ 5 \text{ inch} & = & 8.51200 \end{array}$$

$$3.74528$$

$$1.68$$

$$2096224$$

$$2247168$$

$$374528$$

$$\begin{array}{rcl} \text{Note:} & & \\ 6 \text{ inch} = 1 \frac{1}{2} \text{ inch read in pounds} & & 6.2920704 \text{ pounds} \\ 5 \text{ inch} = 1 \frac{1}{4} \text{ inch read in pounds} & & \text{or } 6 \frac{1}{4} \text{ pounds per foot} \end{array}$$

SAMPLE.

Roll, 12 inch finished diameter, 96 inch face on 10 inch shaft, Specific Gravity, 1.73.

COMPUTATION.

$$\begin{array}{rcl} 12 \text{ inch} & = & 49.02912 \text{ pounds} \\ 10 \text{ inch} & = & 34.04800 \end{array}$$

$$14.98112$$

$$8 \text{ feet}$$

$$119.84896$$

$$1.73$$

$$35954688$$

$$83894272$$

$$11984896$$

$$\begin{array}{rcl} \text{Note:} & & \\ 12 \text{ inch} = 3 \text{ inch read in pounds} & & 207.3387008 \text{ pounds} \\ 10 \text{ inch} = 2 \frac{1}{2} \text{ inch read in pounds} & & \text{or } 207 \frac{1}{4} \text{ pounds finished weight} \end{array}$$

SAMPLE.

Roll, 45 inch finished diameter, 72 inch face on 42 inch shell, Specific Gravity 1.85.

COMPUTATION.

$$\begin{array}{rcl} 45 \text{ inch} & = & 689.47200 \text{ pounds} \\ 42 \text{ inch} & = & 600.60672 \end{array}$$

$$88.86528$$

$$6 \text{ feet}$$

$$533.19168$$

$$1.85$$

$$266595840$$

$$426553344$$

$$53319168$$

$$\begin{array}{rcl} \text{Note:} & & \\ 45 \text{ inch} = 16 \times 2 \frac{1}{2} \text{ inches in pounds} & & 986.4046080 \text{ pounds} \\ 42 \text{ inch} = 16 \times 2 \frac{1}{8} \text{ inches in pounds} & & \text{or } 986 \text{ pounds finished weight} \end{array}$$

APPROXIMATE WEIGHTS OF CYLINDERS—SPECIFIC GRAVITY 1.00

COMPUTED BY GEORGE W. BOWERS

Basis—Cubic Foot = 62.4256 lbs. Avd.

Diameters in Inches.	Ounces per Foot.	Diameters in Inches.	Ounces per Foot.	Diameters in Inches.	Ounces per Foot.
1 64	.00133	1 1/64	5 61925	2 1 64	22 13253
1 32	.00532	1 1 32	5 79348	2 1 32	22 47700
3 64	.01197	1 3 64	5 97037	2 3/64	22 82413
1 16	.02128	1 1 16	6 14992	2 1 16	23 17392
5 64	.03325	1 5 64	6 33213	2 5 64	23 52637
3 32	.04788	1 3 32	6 51700	2 3 32	23 88148
7 64	.06517	1 7/64	6 70453	2 7 64	24 23925
1 8	.08512	1 1/8	6 89472	2 1 8	24 59968
9 64	.10773	1 9 64	7 08757	2 9 64	24 96277
5/32	.13300	1 5/32	7 28308	2 5 32	25 32852
11/64	.16093	1 11/64	7 48125	2 11 64	25 69693
3 16	.19152	1 3/16	7 68208	2 3 16	26 06800
13 64	.22477	1 13/64	7 88557	2 13 64	26 44173
7 32	.26068	1 7/32	8 09172	2 7 32	26 81812
15 64	.29925	1 15/64	8 30053	2 15 64	27 19712
1 4	.34048	1 1/4	8 51200	2 1 4	27 57888
17 64	.38437	1 17/64	8 72613	2 17 64	27 96325
9 32	.43092	1 9/32	8 94292	2 9 32	28 35028
19 64	.48013	1 19/64	9 16237	2 19 64	28 73997
5 16	.53200	1 5/16	9 38448	2 5 16	29 13232
21 64	.58653	1 21 64	9 60925	2 21 64	29 52733
11 32	.64372	1 11/32	9 83668	2 11 32	29 92500
23 64	.70357	1 23/64	10 06677	2 23 64	30 32533
3 8	.76608	1 3/8	10 29952	2 3 8	30 72832
25 64	.83125	1 25 64	10 53493	2 25 64	31 13397
13 32	.89908	1 13/32	10 77300	2 13 32	31 54228
27 64	.96957	1 27/64	11 01373	2 27 64	31 95325
7 16	1 04272	1 7/16	11 25712	2 7 16	32 36688
29 64	1 11853	1 29 64	11 50317	2 29 64	32 78317
15 32	1 19700	1 15/32	11 75188	2 15 32	33 20212
31 64	1 27813	1 31/64	12 00325	2 31 64	33 62373
1 2	1 36192	1 1/2	12 25728	2 1 2	34 04800
33 64	1 44837	1 33/64	12 51397	2 33 64	34 47493
17 32	1 53748	1 17/32	12 77332	2 17 32	34 90452
35 64	1 62925	1 35/64	13 03533	2 35 64	35 33677
9 16	1 72368	1 9/16	13 30000	2 9 16	35 77168
37 64	1 82077	1 37/64	13 56733	2 37 64	36 20925
19 32	1 92052	1 19 32	13 83732	2 19 32	36 64948
39 64	2 02293	1 39 64	14 10997	2 39 64	37 09237
5 8	2 12800	1 5/8	14 38528	2 5 8	37 53792
41 64	2 23573	1 41 64	14 66325	2 41 64	37 98613
21 32	2 34612	1 21 32	14 94388	2 21 32	38 43700
43 64	2 45917	1 43 64	15 22717	2 43 64	38 89053
11 16	2 57488	1 11/16	15 51312	2 11 16	39 34672
45 64	2 69325	1 45 64	15 80173	2 45 64	39 80557
23 32	2 81428	1 23 32	16 09300	2 23 32	40 27708
47 64	2 93797	1 47 64	16 38693	2 47 64	40 73125
3 4	3 06432	1 3/4	16 68352	2 3 4	41 19808
49 64	3 19333	1 49 64	16 98277	2 49 64	41 66757
25 32	3 32500	1 25 32	17 28468	2 25 32	42 13972
51 64	3 45933	1 51 64	17 58925	2 51 64	42 61453
13 16	3 59632	1 13 16	17 89648	2 13 16	43 09200
53 64	3 73597	1 53 64	18 20637	2 53 64	43 57213
27 32	3 87828	1 27 32	18 51892	2 27 32	44 05492
55 64	4 02325	1 55 64	18 83413	2 55 64	44 54037
7 8	4 17088	1 7/8	19 15200	2 7 8	45 02848
57 64	4 32117	1 57 64	19 47253	2 57 64	45 51925
29 32	4 47412	1 29 32	19 79572	2 29 32	46 01268
59 64	4 62973	1 59 64	20 12157	2 59 64	46 50877
15 16	4 78800	1 15/16	20 45008	2 15 16	47 00752
61 64	4 94893	1 61 64	20 78125	2 61 64	47 50893
31 32	5 11252	1 31/32	21 11508	2 31 32	48 01300
63 64	5 27877	1 63/64	21 45157	2 63 64	48 51973
1	5 44768	2	21 79072	3	49 02912

When extreme accuracy is not required the cylinder table may be used to determine weights of round flange rings using average of circumferences for length of cord.

SAMPLE.

Round Flange Ring 7 1/8 inch diameter, 7 1/2 inch hole, 1/4 inch round flange.
COMPUTATION.

$$\begin{array}{rcl} 1 \text{ inch diameter} & = & .34648 \text{ ounces} \\ 7 \frac{1}{8} \text{ inches average circumference} = 23.955 \text{ inches} = & 2 \text{ feet} & \\ & & .68096 \text{ ounces} \end{array}$$

AMERICANIZATION ACTIVITIES IN RUBBER MILLS.

IN response to the questionnaire issued to firm members by The Rubber Association of America at the request of the Immigration Committee of the Chamber of Commerce of the United States of America, the following interesting data have been compiled from the replies from 78 establishments, 52 of which reported a total of 26,003 foreign-born workmen, or 29 per cent of the total number employed.

Averages show that at least 15 per cent of these foreign-born workmen cannot speak English well enough to understand even the simplest commands. This condition is most striking in the larger plants—two employing 7,500 and 3,000 foreign-born respectively, reporting 53 and 75 per cent. In 45 plants only 27.3 per cent of the foreign-born have been naturalized, while in seven plants the number is not known. In other words, 72.7 per cent of the foreign-born workmen, or 21.08 per cent of the total workmen are aliens. In 35 plants it is known that 71 per cent desire to become citizens, while in 17 of these the number reaches 100 per cent.

When asked whether a census covering these points would be of value, 12 answered affirmatively, six negatively and 34 did not reply. The replies showed that the number of foreign-born and their ability to speak English was quite generally known, but the naturalization status was but roughly estimated by 45 plants and only 35 had any idea whatsoever of the number desiring citizenship.

Seventeen plants help their employees to learn English, but only two conduct classes within the plant, the attendance being on company time in one and on the employees' time in the other. However, 27 cooperate with public night schools and 14 arrange adjustments between the class hours and plant shifts to make continued attendance possible. All endeavor to treat foreign and native-born alike and 39 discourage all epithets such as "dago," "hunkie," etc.

Central employment offices are maintained by 36 plants, to handle all matters pertaining to hiring, firing, promotions, transfers, voluntary lay-offs, and other matters relative to promoting fair treatment for foreign-born workmen. The incentives to create a contented and stable labor supply vary. Safety and first-aid work are maintained by 36, lunch rooms by 20, wash rooms by 29, while insurance benefits are given by 29, and bonuses by 18. Seven plants do specific work for the housing of their workmen. Welfare work of various kinds is carried on by 21 plants, while 26 keep in touch with social-betterment movements in the community, which affect their workmen.

It is interesting to note that in the six plants employing over 1,000 foreign-born, the 19,495 foreign-born employees constitute 47.5 per cent of the total employees, at least 35 per cent do not understand English and only 14.2 per cent have been naturalized. A chart which has been prepared in this connection, shows that as the average ability to speak English increases and approaches 100 per cent the percentage of employees naturalized also approaches the same maximum. The results also show that the alien's desire for citizenship increases in direct proportion to his ability to speak English, which is his medium for the absorption of American ideas and thus an index of his ability to appreciate the value and meaning of American citizenship.

At a time when business is lending all efforts toward maximum efficiency Americanization work takes on greater than normal importance and the further suggestions of the Immigration Committee, based on the conditions as reported, commend themselves to every manufacturer.

1. GENERAL. In practically all cases there is lurking a complete and coordinated plan of work for all the personnel activities of the plant under the supervision of a trained and tactful director.

2. CONFERENCES. Collective action is needed and frequent conferences with superintendents and foremen will help to create a clear understanding.

3. A CENTRAL EMPLOYMENT DEPARTMENT should be organized under the direction of a responsible executive, which shall have charge of all personnel work. All matters connected with employment, transfer, promotions, layoffs, dismissals, physical conditions, affecting the comfort and social needs of the men inside the plant and all community relationships affecting education, citizenship, housing and standards of living, should be cleared through this department, no matter what their source. It should be the clearing house for employees where grievances and complaints can be heard and adjusted and advice and information can be given.

4. REGISTRATION. All applicants for employment should be registered when they apply for work even though a vacancy does not exist, so that immediate contact can be made later.

5. THE APPLICATION BLANK for employment should contain definite questions relating to the applicant's residence in the United States, his literacy in the English and his native language and his citizenship status.

6. PROMOTIONS. The reverse side of the "Employee's Record" card should be used for recording efficiency and producing ratings, regularity, etc., which should serve as the basis of promotions. A policy of promotions from within the plant, properly announced, thoroughly understood and consistently adhered to will do much to increase efficiency.

7. DISMISSALS. Records should show number of men discharged and those who quit voluntarily and the reasons therefor. There should be a definite rule that all firing should be done through the employment department and all persons leaving the company's employ should be carefully interviewed. Causes of dissatisfaction can thus be determined and adjustments or transfers to other departments in the plant can be made.

8. A NURSE should be employed, speaking foreign languages, to follow up cases of absence, remove the causes and develop an American standard of living in the home.

9. SAFETY-FIRST WORK. Until all employees learn to read English some of the safety rules should be printed in the important foreign languages and posted.

10. INSURANCE. Special efforts should be made to gain the understanding and interest of the foreign-born employees in the plant association which will bring them into social contact with the American employees—a very strong factor in Americanization. Lunch, reading and rest rooms should be provided, which will further mix the workmen, and raise their working efficiency through relaxation.

11. SAVINGS. Greater thrift means higher standards of living, and a more efficient and stable labor supply. Local banks may be induced to send a teller to the plant every pay day and officially accept deposits there.

12. A COMMON LANGUAGE. If a definite cooperative arrangement cannot be made between the plant and the public schools to stimulate attendance—similar to the Detroit plan—another and perhaps better method is the establishment of classes in the plant before or after shifts, and before the men are scattered to their homes. (Standards and methods for this work can be secured from the Division of Immigrant Education of the United States Bureau of Education).

13. A UNITED CITIZENSHIP. All those desirous of becoming citizens should be enrolled in special classes and receive instruction in the principles of the American form of government.

14. HOUSING. It is well to keep careful records of employees' housing and living conditions. Bad home conditions tend to increase the labor turnover by stimulating search for work in other communities. The stability of the labor supply is largely dependent on the creation of a home-stake in the community.

15. COORDINATION OF PLANT ACTIVITIES WITH CITY-WIDE AMERICANIZATION WORK. A conference of the industrial leaders in each locality should be called at which the conditions, principles and methods of Americanization work for the community and the industrial plants can be outlined. One plant is so dependent on another, with respect to labor supply, that every effort should be made to coordinate city-wide work to promote the loyalty and stability of the alien workmen in the national crisis the country is facing.

ACCORDING TO "THE TIRE YEAR BOOK" THERE ARE IN THE United States 40,912 firms of whom tires can be bought at retail. These are divided as follows: 25,924 dealers; 23,686 garages; 12,471 machine shops; 5,675 firms having auto-supply departments, and 2,503 supply stores. Many firms, of course, are listed in two of these classifications.

The Rubber Association of America.

MECHANICAL RUBBER GOODS MANUFACTURING DIVISION MEETING.

AN important meeting of the Mechanical Rubber Goods Manufacturing Division of the Rubber Association was held August 15 at 17 Battery place, New York City. There were present 25 members representing 22 manufacturers. The following communications from the Committee on Cotton Goods of the Council of National Defense were read:

The unusual requirements for tentage and other heavy duck has necessitated the utilization of looms not ordinarily employed on these fabrics to the extent that much of commercial business has of necessity been curtailed and many looms adapted to hose ducks have been put on numbered ducks and tent ducks. Knowing the vital necessity of railroad supplies, particularly of air brake hose, steam and signal hose, which is essential to the proper maintenance of the railroad equipment, it was realized that unless accurate figures were secured of the supplies now available of these several fabrics, and the quantity likely to be required during the next year, it might be possible that by employing machinery usually engaged on these fabrics on other work, it would not be available to supply the demand when needed.

We have, therefore, to request that you furnish us with as nearly accurate figures as is possible of the present visible supply of air brake, steam and signal hose ducks in the possession of the various rubber manufacturers as well as the stock of these made up articles in the possession of the various supply houses, that we may report to the Council of National Defense at Washington the available supply, as well as the probable requirements for the next year, in order that proper provision may be made with the cotton goods manufacturers for taking care of these requirements.

We acknowledge receipt of your favor of August 2 which was taken up and discussed at the Committee meeting of yesterday. The sense of the Committee was that it would be ill advised to send our inquiries direct to the trade in general. Have to advise that you secure by best means possible through your Committee the information desired on steam, air brake and signal hose ducks. We would also request that you ascertain as soon as possible the quantities of stocks of 30 and 32 ounce belting duck in 42 and 50-inch widths.

A general discussion of the duck situation followed, and every member present gave his views on the question. From the remarks it was evident that a number of firms represented had orders and contracts for manufactured goods running well into next year, and in some instances they had contracted for a supply of cotton duck, yarn, etc., to meet their requirements. There seemed to be a general feeling, however, that the requirements of the government would make it impossible for the cotton manufacturers to deliver to the rubber trade all the materials called for.

The question of preparing figures showing the amount of unfinished and finished stock on hand and an estimate of the amount of cotton goods necessary to meet the demands for the coming year was also thoroughly considered at the meeting and it seemed to be the general opinion of those present that before this was done the members of the Division should have a clearer understanding of the cotton fabric situation and more definite information as to the possible requirements of the government under the present unusual conditions. All expressed their perfect willingness, however, to give the Committee or representatives of the government any information they might desire including the amount of stock on hand, etc., if called upon to do so.

From the discussion it was evident that there was a general feeling that a Committee to represent the members of the Division should be named to investigate the present situation and secure all data possible, as to present and possible future conditions, for the information of the members of the Division so that intelligent action could be taken.

The Chairman suggested that the proposed committee be made a permanent committee to handle matters of this kind and stated that it was his opinion the cotton situation was at all times of sufficient importance to require a special committee to treat with any situation which might arise.

It was unanimously voted to appoint a committee of seven to confer with the cotton duck, yarn and other manufacturers of cotton fabrics and to investigate the entire situation, seeking any necessary information at Washington, and reporting its findings

to the members of the Division as promptly and fully as possible.

The Chairman appointed Messrs. Cobb and Bailey as a committee to submit a list of nominations for the proposed committee. The following firm members were nominated and unanimously elected, their representatives to be designated by the companies named: Rubber Goods Manufacturing Co., The Goodyear Tire & Rubber Co., The B. F. Goodrich Co., Fabric Fire Hose Co., Boston Woven Hose & Rubber Co., United & Globe Rubber Manufacturing Cos., Republic Rubber Co.

During the discussion, Mr. Beynon, of the Dunlop Tire & Rubber Goods Co., Limited, stated that he was particularly interested in whatever action was taken by the Division, and also what the attitude of the U. S. Government might be in the matter, as he thought it very likely that the Canadian Government would take action along the same lines.

Mr. Voorhees stated that at least 20 per cent of the available looms for cotton goods had been taken over for government work exclusively and that this percentage would undoubtedly be increased to fully 50 per cent within a year.

By special invitation, J. Spencer Turner, chairman, and C. S. Green, secretary, of the Committee on Cotton Goods of the Council of National Defense, were present to explain the difficulties encountered by the cotton goods people.

Mr. Turner stated that he thought if the manufacturers of rubber goods could obtain from the government some definite expression as to its requirements for the coming year, it would facilitate the solution of the present day problem. On the other hand, it should be brought to the attention of the government that there were certain lines of goods, such as air brake hose, steam hose, etc., which were being delivered to the railroads and were of such vital necessity as to be classed as war material.

Mr. Turner also referred to the fact that while the manufacturers throughout the country must make every effort to meet the government demands, at the same time their regular domestic trade should receive some consideration and it would seem that a thorough understanding of the interests of all parties concerned should be given just and fair consideration.

In response to a question Mr. Turner assured those present that a large percentage of the facilities of duck manufacturers throughout the country had of necessity been given up to government work and he seemed to think that cooperation on the part of the manufacturers of rubber goods with the duck manufacturers was the best solution of present difficulties. He stated he was sure the cotton duck people would be very willing to confer with representatives of the rubber goods trade at all times to adjust the distribution of cotton goods as much as possible.

A committee of three was appointed to suggest topics to be brought up and discussed at the monthly meetings. This committee consists of the following: A. Boyd Cornell (chairman), J. J. Voorhees, Sr., George A. Wies.

ANOTHER RUBBER SMUGGLING PLOT DISCOVERED.

Charged with smuggling rubber medical goods and platinum into Germany by way of Holland and Belgium, nine men, said to be citizens of Belgium, six of them reported to be firemen on a Belgian relief ship chartered to convey relief supplies from the United States to their destitute countrymen, were arrested in New York City August 10, culminating a long investigation of the methods by which Germany has been able to get much needed supplies from America.

Agents connected with the Department of Justice believe that merchandise valued in this country at from \$25,000 to \$30,000 has been smuggled weekly from Atlantic ports. The value of these articles is said to be fivefold in Germany.

According to the police, the six men were walking rubber shops. Under their clothing, the detectives assert, they found soft rubber medical articles, wrapped layer upon layer, about their bodies, giving them a puffed-up appearance. One man carried more than 100 bathing caps between his skin and underwear.

The six men gave the police much information regarding the underground smuggling system and several German agents from whom these men obtained goods are also under arrest.

Jelutong, or Pontianak, Is Crude Rubber and Duty Free.

A CASE of much importance to importers and users of Jelutong, or Pontianak, rubber was recently decided by the United States General Appraisers. This rubber had always been admitted free of duty until June, 1916, when the government suddenly assessed an import duty of 10 per cent on it as a non-enumerated, unmanufactured article under the provisions of paragraph 385 of the tariff act of 1913. L. Littlejohn & Co., Inc., New York City, importer and dealer in crude rubber, protested, claiming that Jelutong was a crude rubber, and as such entitled to free entry under paragraph 513. The decision recently handed down sustains this protest.

The case was tried on February 19, 20 and 21. The attorneys for the importers were Thaddeus S. and Edward P. Sharretts, the government being represented by Assistant U. S. Attorney-General Hanson, with Robert Hardison as special counsel. Frederick J. Maywald, the chemical expert, collaborated with the attorneys in preparing the case, and some of the government officials, as well as others interested in the case, declared that it was one of the best presented and most completely prepared cases which had ever been brought in the Customs Court. A large number of witnesses, technical experts and manufacturers, were called on the importers' side, and a great many exhibits were introduced in evidence.

The testimony on behalf of the importers covered three distinct lines, *viz.*, first, the trade meaning of the term "india rubber" as used in the Tariff Act; second, the trade classification of Jelutong, or Pontianak, by importers and rubber manufacturers; third, the chemical and botanical identity of Jelutong as a rubber.

John T. Callahan, president of the Archer Rubber Co., testified that there was no difference between rubber and india rubber, which refers to all the various types and grades of crude rubber among which is Jelutong. He stated that his company bought Pontianak, or Jelutong, as a crude rubber and used it as such; that Jelutong was one of the various rubbers used in its compounds, and that it was necessary to mix various rubbers in order to obtain certain desired results. He said further that his company never used Pontianak, or Jelutong, except as a crude rubber, and knew of no other use for it; that it was never used as a filler.

William E. Bruyn, treasurer of L. Littlejohn & Co., Inc., testified that his company bought and sold Jelutong purely as a crude rubber, and that throughout his business experience of fifteen years he had never purchased it, or knew of its being regarded as other than a crude rubber. Similar statements were made by Francis R. Henderson, of Henderson & Korn; Thomas A. Desmond, of Robinson & Co., and G. A. Luddington, purchasing agent of the Fisk and Federal rubber companies and formerly an importer and dealer in crude rubber.

Robert C. Hartong, chief compounding chemist of The Good-year Tire & Rubber Co., said that Jelutong was used solely as a rubber and as a necessary component of some of the compounds prepared by his company. He illustrated this with samples, the compounds being the same except that in one case Jelutong was used in the mixture, while in the other case no Jelutong was used. His testimony clearly established the fact that Jelutong had definite qualities as a rubber, and that those qualities in a rubber compound could be obtained only by the use of Jelutong or a similar rubber.

Ralph B. Naylor, chief compounding chemist of The Fisk Rubber Co., Chicopee Falls, Massachusetts, and James J. Clifford, superintendent of manufacture of the Boston Woven Hose & Rubber Co., Cambridge, Massachusetts, also referred to the necessity of using Pontianak, or Jelutong, as one of the rub-

ber components of many different kinds of rubber compounds, and said that they never used it for any other purpose than as a rubber. Mr. Clifford also showed samples, using other lines of goods than those produced by Mr. Hartong, the combined exhibits including automobile tires, garden hose, rubber shoes, etc.

William G. Hopkins, purchasing agent of the Boston Woven Hose & Rubber Co., stated that since 1905, when he became purchasing agent, he had always bought Jelutong as a crude rubber and had always regarded it as such. He said further that it was carried in the inventories and stock sheets of his company with the other crude rubbers used.

Julian A. Whitcomb was called as a botanist and expert in the growing and preparation of crude rubbers. He illustrated his testimony with sections of an *Hevea* tree and a Jelutong tree. These trees, together with latices of trees of each of these kinds, were imported from the East by L. Littlejohn & Co., Inc. Mr. Whitcomb readily identified both trees, and proved by illustrations of the appearance of the bark and wood, and in other ways, that the trees were what they were stated to be. He introduced samples of rubber which he had prepared by coagulation of the latices from the two different trees, and explained how these rubbers were prepared and how they could be identified by their appearance. He further explained the method of tapping and preparing Jelutong, *Hevea*, *Caucho*, *Landolphia* and other rubbers in their native places, as he had explored and traveled extensively in the Far East, in Africa, Mexico, Central and South America, and also explained the various kinds of Jelutong trees, describing the differences between them, their habitats, their growth, and the method of preparation of the rubber from the latices. Pontianak, he explained, is another term for Jelutong, the name under which the commodity in question had been invoiced; that the word "Jelutong" is derived from the plant from which this rubber comes, and that the word "Pontianak" is the name of a town and district in Borneo from which it is procured, an identical product being imported from British North Borneo and Sumatra. Roger S. Hardy, another expert, corroborated this testimony.

Frederick J. Maywald then testified as to the chemical identity of Jelutong and other rubbers, stating that rubber is the only material that has both plasticity and elasticity and that Jelutong combines both qualities. He explained the method of compounding and curing rubbers, described the differences between various rubbers as to physical qualities, curing time and other characteristics, and told of the qualities imparted by various rubbers to certain compounds. He said that he had an experimental plant and had made a large number of samples of various kinds. Many of these samples were introduced in evidence. He showed samples of both wild and plantation rubber from practically every well-known rubber family. He showed samples compounded with these various rubbers, and explained the various times of cure and proportions of sulphur necessary to bring about the same cure with different rubbers, clearly showing that hardly any two rubbers were identical in their characteristics. He also testified as to Jelutong being regarded, both in the trade and in the literature, as a crude rubber, and mentioned particularly Circular 38 of the Bureau of Standards, Department of Commerce, in which Jelutong is classified as one of a number of rubbers. The witness introduced samples of crude washed and dried rubbers, and some rubbers which had been deresinated, thus showing that the basic component in each case was caoutchouc or rubber gum, and that all were substantially identical. He said further that all

rubbers contain resin, and that the resin content varies, not only as between different families, but also in the same family, when obtained from different sources. He explained the chemistry of the vulcanization of rubber, so far as it is understood at the present time.

The government then called Mr. Montgomery, examiner of chemicals and drugs in the Appraiser's Office, who testified as to the custom in examining Jelutong, and stated that it was his belief that it has been returned as a crude drug. William H. Quinton testified along similar lines for the government, and introduced in evidence invoices of importations of various rubbers, including Jelutong.

H. L. Brown stated on behalf of the government that he was using about 25 tons of Jelutong a year in the manufacture of chewing gum. On cross-examination, however, he admitted that he did not use Jelutong as such, but extracted the resins and used them in chewing gum, selling the remaining rubber to rubber manufacturers. He said further, on cross-examination, that it was not possible to use the untreated Jelutong in chewing gum.

The case was then closed, and both attorneys were ordered to file briefs. The opinion, delivered by General Appraiser Hay for the Board, reviews the testimony as already set forth and concludes:

The above statement of fact would seem to conclusively decide the question at issue.

There is no doubt from this testimony but that the commodity is known throughout the trade of the United States as crude rubber, and, that india rubber and crude rubber are the same thing. Nor is there any doubt from this testimony but that it is used for the same purpose as other kinds of rubber and has the same qualities, the difference being only one of degree. In our judgment the testimony clearly brings Jelutong within the purview of paragraph 513. This conclusion we think is in line with the dictionary meaning of the word, the encyclopedic authorities and such technical authorities as treat of the subject.

The protest is therefore sustained and the collector will liquidate the entry accordingly.

BOARD OF U. S. GENERAL APPRAISERS.

Entry 197,286 returned herewith.

JUDICIAL DECISIONS.

RACINE RUBBER CO. v. INDUSTRIAL COMMISSION, Supreme Court of Wisconsin, May 15, 1917. An employee of the rubber company was seated in a room in the factory at the noon hour eating his lunch, in accordance with a long-existing custom known by and tacitly consented to by his employer, when a large piece of rubber unexpectedly fell on him and broke his leg. He was awarded compensation by the Industrial Commission, and the employer appealed. The Court decided that he had been, at the time of the accident, engaged in service growing out of or incidental to his employment within the meaning of the Workmen's Compensation Act. The award was therefore affirmed, with costs, to the employee. [Northeastern Reporter, Vol. 162, page 664.]

INNER SHOE TIRE CO. v. KNAPP-BROWN CO., Supreme Court of South Dakota, June 26, 1917. The Inner Shoe Tire Co., manufacturer of a lining for tire casings, made an oral contract with the Knapp-Brown people to vulcanize their product into the casings. The manufacturer supplied order blanks and made a shipment on an order written on one of them. They claim that this was an outright sale, while the vulcanizers claim that they acted merely as agents and the goods were shipped on consignment in accordance with the verbal contract and that they were returnable if they were not needed. A judgment in favor of the Knapp-Brown people in the Municipal Court of Sioux City was affirmed by the Supreme Court. [Northwestern Reporter, Vol. 163, page 572.]

THERMOID RUBBER CO. v. BRITSON, Supreme Court of South Dakota, June 26, 1917. The Britson Manufacturing Co. is the

manufacturer of a rubber tread intended to protect tires and prevent skidding. This company bought of the Thermoid Rubber Co. tires and tubes which were to be used in conjunction with its product. These were guaranteed to be the equal of any on the market, but when they were delivered and sold they proved defective. Because they were faulty many of the customers refused to pay for either the tires or the treads. As the treads were extensively advertised the company sustained a great loss and brought suit to recover \$25,000 damages. It was decided that because the Thermoid company could sue the purchasers for the value of the tires, they did not suffer so great a loss. This judgment was affirmed in the Supreme Court. [Northwestern Reporter, Vol. 163, page 567.]

THE B. F. GOODRICH CO. v. SEWELL CUSHION WHEEL CO., Supreme court of Michigan, May 31, 1917. The B. F. Goodrich Co. and its predecessor, the Diamond Rubber Co., for a number of years, manufactured for the Sewell company, rubber cushions used by them in a patented wheel for automobile trucks. The cushions are made of the best grade rubber that could be procured and sold on a five-year guarantee. In October, 1913, an order was placed for some of these cushions, and shipments made to the amount of 979 pounds. It is conceded that the rubber was under-cured and some 800 pounds returned to the factory to be re-cured. The Goodrich people submitted a sample of a part of the rubber which they had re-cured which was satisfactory. When the bulk of the re-cured rubber was returned it was found to be of a poorer quality than that which the Sewell people were used to getting and they could not use it because of the five-year guarantee. They therefore notified the sellers that the goods were held subject to their order. Fruitless negotiations followed and suit was brought in the Circuit Court, where a judgment in favor of the buyer was given and this was upheld by the Supreme Court, with costs to the Sewell company. [Northwestern Reporter, Vol. 163, page 5.]

THE GOODYEAR TIRE & RUBBER CO. v. E. W. WARD AND OTHERS, St. Louis Court of Appeals, May 8, 1917. The Goodyear company sold a bill of goods consisting of tires and tubes to the "New York Motor Car Co." which, it alleges, is composed of E. W. Ward, Oscar J. Mueller and Adolph Grohe. When the case was first tried before a justice of the peace, he decided that there was no cause for action against Mueller. In the Court of Appeals evidence was introduced which showed that Mueller had signed a contract for the sale of automobiles with the Elmore Manufacturing Co. and had shared the profits on sales made under the agreement with the other members of the firm. He, however, did not share in the profits of the repair department, which was run in the name of the firm, but he used part of the goods sold to pay the rent of the firm's office. It was therefore decided that he was responsible for the debt with the others and the case was remanded for further trial. [Southwestern Reporter, Vol. 195, page 75.]

DOOLITTLE v. SAVAGE TIRE CO., District Court of Appeals, Second District of California, April 19, 1917. M. G. Doolittle was employed by the tire company as a salesman and made an agreement with the sales manager to use his automobile in connection with his work, for which use he was to receive a reasonable compensation. He used the machine from the beginning of August, 1913, until the end of August, 1914. In March, 1914, a new arrangement was made whereby the company supplied the gasoline. Evidence showed that the value of the use of the automobile was \$100 per month if he supplied the fuel and \$75 a month while it was supplied to him. Thus the total value of the use of the machine figured about \$1,000. Suit was brought in the Superior Court and judgment found for that sum. The company appealed but the judgment was affirmed. [Pacific Reporter, Vol. 165, Page 728.]

MILLER v. HARVEY, Court of Appeals of New York, May 22, 1917. The general rule which concedes the delivery of goods, in

this case automobile tires, to a common carrier as a delivery to the buyer, has an exception where the goods which were bought and paid for, were delivered to the express company and the seller neglected to state their value, \$95.43, which neglect limited the liability of the express company to but \$50. The tires were lost in transit and the buyer requested a second shipment which was made. A suit was brought by the seller for the value of the delivered goods. It was decided that the buyer was entitled to the second shipment. The seller appealed but the judgment was affirmed. [Northeastern Reporter, Vol. 116, page 781.]

In re GIBNEY TIRE & RUBBER Co., United States District Court, Eastern District of Pennsylvania, May 7, 1917. In an involuntary proceeding in bankruptcy based on the bankrupt's admission in writing of its inability to pay its debts and its willingness to be adjudged a bankrupt, an adjudication was made within five days after the return day of the subpoena, which are allowed under the provision of the Bankruptcy Act, and creditors, who had not then intervened, subsequently filed a petition to vacate the judgment and permit them to defend, alleging only the solvency of the bankrupt. It was held that, while such solvency would not prevent a judgment on the ground upon which the proceeding was based, this was not a sufficient reason for refusing to vacate it, as creditors seeking the vacation of a judgment prematurely entered are not required to show facts constituting a good answer to the bankruptcy petition, and their allegation as to solvency was not intended to serve as an answer, but to show a substantial right on their part to intervene. [Federal Reporter, Vol. 241, page 879.]

RUBBER TRADING CO. v. MANHATTAN RUBBER MANUFACTURING Co., Court of Appeals of New York, June 5, 1917. The Manhattan Rubber Manufacturing Co. agreed to buy 15 tons of prime thin Maniçoba rubber at \$1 a pound, delivery to be made about five tons a month in September, October and November, 1912, and billed on a credit of ten days. The first delivery made under this contract was made in August and paid for in September without previous inspection. Defects were found and 7,900 pounds were returned with the consent of the importers. When the second shipment arrived in October, the buyers were notified and asked to examine the rubber while on the dock or in the warehouse, and they refused to accept the rubber until it could be put through a test at their factory. The Trading company refused to issue delivery orders until they received the acceptance. The other shipment arrived in November and neither party would recede from its position. Each party notified the other that the contract had been broken. Part of the rubber was sold at a reduced price and the rest was retained. Action was brought to recover the profit which had been lost. Judgment was found in favor of the sellers, and upheld by the Appellate Division of the Supreme Court, but when taken to the Court of Appeals it was reversed and a new trial granted, with costs to abide the result. [Northeastern Reporter, Vol. 116, page 789.]

MASTER TO EVALUATE MUNGER RIM PATENT.

In an unusually detailed interlocutory decree, Judge Manton has appointed James J. Kennedy, of New York City, as master to go over the books of the Perlman Rim Corporation and determine how much Louis DeF. Munger should receive in back royalties on his patent as a result of winning his recent infringement suit. The decree contains the specific instruction that the master is to "consider the nature of the invention, its utility and the advantages to be gained from its use" as a basis for determining the rate of royalty. The task of evaluating the patent itself is best measured by the fact that the whole industry has not yet been able to do so. It is one that will probably take many months to accomplish, and further delay will be occasioned by the fact that all is contingent upon the recent decision being upheld on appeal.

TRADE-MARK DECISIONS.

COLOR NOT REGISTRABLE AS A TRADE-MARK.

DECISIONS of the Commissioner of Patents regarding the registration of trade-marks of rubber goods of special interest to manufacturers, are to the effect that color of the goods is not sufficiently distinctive to be allowed as a trade-mark. In the case of *The B. F. Goodrich Co. v. Firestone Tire & Rubber Co.*, 123 Ms. Dec. 60, May 22, 1917, opposition was filed to the registration of a mark for tires, consisting of a circumferential band of black, between two circumferential red bands. Opposer used a black tread for its tire, with side walls of gray. The commissioner decided that it makes no difference whether the marking was for purposes of ornamentation, or as a trade-mark. The color scheme is not distinctive enough for a trade-mark and cannot, therefore, be monopolized.

In an opposition filed against the preceding mark—*Lee Tire & Rubber Co. v. Firestone Tire & Rubber Co.*, 123 Ms. Dec. 62, May 22, 1917—opposer claimed it first used red sides with a gray tread for tires. The making of sides and tread of different color is functional, because the parties agree that different rubber should be used in the different places, as they are of different color. The opposition is sustained.

In an opposition to the registration of the same mark—*Good-year Tire & Rubber Co. v. Firestone Tire & Rubber Co.*, 123 Ms. Dec. 63, May 22, 1917—opposer claimed he used a central circumferential band of blue. There is no valid trade-mark in coloring an automobile tire to be one color on the sides and another on the tread, regardless of what the colors are. It is not only not distinctive, but the making of sides and tread of different color is functional. There is no trade-mark in a device that depends on color to distinguish it. This case is distinguished from cases where a design is distinctive apart from the color. Color is not definitive in any case; there are innumerable shades of any color. The proposed registration would give a group of applicants a monopoly of the natural and practical designs for ornamenting a tire to distinguish it from other tires. Distinctiveness of a mark must rest in something not equally open to use by others.

An opposition to application to register a black and red combination of color for tires—*Firestone Tire & Rubber Co. v. Goodrich Co.*, 123 Ms. Dec. 68, May 22, 1917—was dismissed, on the ground of prior use of gray and black colors by the applicant. However, the mark is not properly registrable and should be rejected.

An opposition filed to the foregoing mark on the ground of prior use of a black tread and red sides by opposer—*Miller Rubber Co. v. Firestone Tire & Rubber Co.*, 123 Ms. Dec. 66, May 22, 1917—was sustained, for the reasons given in the preceding decision.

The case of *L. Candee & Co. v. Hood Rubber Co.*, 123 Ms., Dec. 78, is a petition to cancel a trade-mark applied to rubber boots and shoes, consisting of a gray band encircling the top of the articles. Petitioner having shown prior use, it is immaterial whether the mark was structural or for ornament, or as a trade-mark for the particular goods. Whatever significance the band had in one case, it has in the other. If functional with the petitioner, it is so for applicant, and the mark is therefore not registrable. Color is not distinctive, in any case, and such a mark is fundamentally improper. The mark is, therefore, properly cancelled.

A STRIKING COMPARISON APPEARS IN A REPORT OF THE COMMISSIONER OF Patents, in a recent decision considering the application of a trade-mark for rubber goods. He says, "There is no such thing as a general trade-mark, any more than there could be such a thing as one twin."—Well, that isn't an impossibility. Perhaps you know somebody who is one twin. We do. His brother is dead.

What the Rubber Chemists Are Doing.

THE PREPARATION OF RAW RUBBER

THE preparation of raw rubber with special reference to "Slab" rubber and variability is discussed by B. J. Eaton in the Agricultural Bulletin of the Federated Malay States (February and March, 1917). The following questions have been raised in connection with what has been termed by Eaton "Slab" rubber; that is, unpressed, or lightly pressed or rolled coagulum.

1. Does the preparation of this type of rubber lead to greater variability or uniformity? Is it a solution of the problem of uniformity?

In the opinion of the author the preparation of this type of rubber will tend toward greater uniformity than exists at present. Putting aside the preparation of pale crêpe, which may be considered from the point of view of its uses a special preparation, it is proposed to substitute "slab" rubber for sheet, so that variability has to be considered, principally as between slab and sheet. It has been shown that the cause of variability in rate of cure is due chiefly to biological agencies, acting on the protein constituents of the rubber, producing substances of the nature of amines or amino acids which act as vulcanization accelerators, and that numerous variable factors in methods of preparation affect the amount of such accelerators which are formed. It is obvious that the more variable factors the greater the variability of the product. The author holds that greater variability is introduced in sheet than in "slab" rubber, which undergoes the minimum of handling. One of the greatest factors responsible for variability in rate of cure of sheet rubber is the rate of drying, including smoking, and, secondly, the concentration of the latex and the amount of rolling.

Since the primary cause of variability in rate of cure is biological, it may be thought that considerable variability would be caused by an uncontrolled fermentation or decomposition, such as occurs in coagulum. It should be remembered that in this country (Malaysia) the shade temperature is very constant during the day and this constancy, in the author's opinion, is responsible for the remarkable uniformity of the change which takes place in unrolled coagulum left to mature for six days, together with the fact that the latex during collection is thoroughly exposed to numerous chance organisms which enter it. This remarkable uniformity of "slab" rubber has been proved by the writer, not only in all his experimental samples, which include many hundreds, but also in samples prepared on different estates in various parts of the country.

2. Is slab rubber, apart from the advantage to manufacturers of its rapidity of cure, of better quality than other first-grade types?

All our experiments have shown that the tensile properties of "slab" rubber are from 20 to 25 per cent better than those of crêpe rubbers and generally superior to sheet rubber, and since sheet is superior to crêpe in general, it may almost certainly be argued that the keeping properties of vulcanized "slab" rubber will also be superior. The superior tensile properties of "slab" rubber may be either an inherent quality of the raw rubber, or due to the much shorter time of vulcanization required for its optimum cure and maximum tensile properties.

There are thus two advantages in favor of "slab" rubber—rapidity of cure and superior tensile properties.

3. Will ultimate manufacturing difficulties be likely to be greater than those which exist with present types of first latex plantation rubber?

There is absolutely no reason why the preparation of "slab" rubber should cause greater confusion or difficulty for the manufacturer than is caused by the variability in rate of cure which exists at present in the case of sheet and crêpe rubbers.

In demonstration the author cites the fact that a large American concern on its Malaysian plantation prepares "slab" rubber for use in its own factories in America.

4. In what form should slab rubber be shipped, having in view the extra freight on wet rubber?

There are only three forms in which "slab" rubber can be placed on the market, as follows: (a) Virgin slab containing about 20 per cent of moisture, (b) as dry crêpe, (c) as block.

The first form necessitates payment of freight on water to practically the same extent as in the case of Fine Hard Para, which does not appear to cause any difficulties on the market.

The advantage of converting slab to crêpe on the estate is that freight on moisture is eliminated. It is doubtful whether the advantage in favor of marketing this type of rubber in the form of crêpe is sufficient to neutralize the disadvantage of shipping virgin "slab."

The third form in which this type of rubber can be marketed is dry block made from artificially dried crêpe. At the present stage no definite statement can be made as to which of the three forms will eventually prove the most satisfactory, although in the author's opinion, shipping in the form of virgin "slab" or dried block is preferable to conversion to crêpe on the estate and shipping as crêpe.

The company referred to as shipping "slab" rubbers from its estates packs it in bags only.

The author expresses his opinion that the "slab" type of plantation rubber is of considerably greater value than the types of plantation Para rubber at present on the market and also is superior to Fine Hard Para.

GLYCERIN SUBSTITUTES.

An efficient glycerol substitute by J. Lennox is reported as follows in "Chemical Abstracts." The formula yields a product which has body, a sweetish taste and is reasonably permanent. Irish moss (washed) 0.5 ounce; water, 24 fluid ounces. Keep at boiling temperature in a covered vessel for 15 minutes, strain the mixture with pressure, pour upon the muslin boiling water, make up to 19 fluid ounces; then add glucose one ounce, mix and strain through double ply without pressing.

The drug trade is using a sugar syrup as a substitute for glycerin. Its composition is invert sugar 46.8 per cent, sucrose 29.35 per cent, ash 0.05 per cent, water 23.8 per cent. This material would probably be found valueless in connection with rubber work where glycerin is employed.

SUBSTITUTE FOR RUBBER.

Sterilin is suggested as a substitute for rubber finger cots for medical examinations. It fits the finger well, does not affect the touch, is washable with soap, and can be disinfected with lysol and corrosive sublimate. It cannot be sterilized in steam. [A. Pinkus, Berlin, through "Chemical Abstracts."]

ANTIMONY AS TRISULPHIDE.

The following method for the determination of antimony as trisulphide, by C. B. Clark, is based on the fact that antimony trisulphide can be converted into the black crystalline modification by passing hydrogen sulphide into the hot liquid containing a large excess of hydrochloric acid. In practice the solution of the antimony salt is heated with 24 to 100 cc. hydrochloric acid on a water bath, and frequently shaken while a current of hydrogen sulphide is passed through it. The conversion of the sulphide into the black form will be completed after 30 to 35 minutes. The precipitate is collected in a Gooch crucible, washed with water and alcohol, and dried at 270 to 280 degrees C. in a current of carbon dioxide.

The sulphide is convertible into pentoxide by ignition with a weighed quantity of ferric oxide and ferric nitrate.

CHEMICAL PATENTS.

THE UNITED STATES.

RUBBER COMPOSITION. A flexible rubber composition is made by disintegrating vulcanized fibrous rubber waste, mineral oil or other oily matter which prevents too fine reduction of the fibers. The disintegrated mass is mixed with sulphur and then subjected to heat and pressure to revulcanize the rubber. [F. T. Lahey, United States patent No. 1,233,252.]

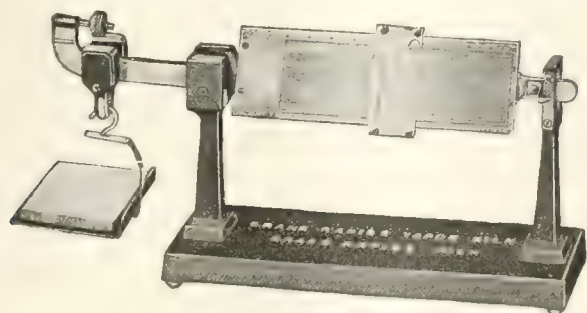
THE UNITED KINGDOM.

RUBBER SUBSTITUTES. A substitute for rubber is made from a mixture of 24 parts gelatine or glue, 28 parts glycerol, glucose or molasses, 10 parts water, 8 parts each rubber, zinc oxide, and diatomaceous earth or whiting, 5 parts of sulphur, 3.5 parts calcined magnesia, 2.5 parts litharge, 2 parts formaldehyde, potassium bichromate, tannin or like toughening agent, and 1 part coloring matter. Calamine, Pontianak, asphaltum, coal tar or pitch, or like softening agent may be employed as substitutes for the gelatine or glycerol. The mixture is subsequently molded and vulcanized. It may be used as an inner core for tires, for electric insulation, tilings, roofing, etc. [J. Flint, British Patent No. 105,912.]

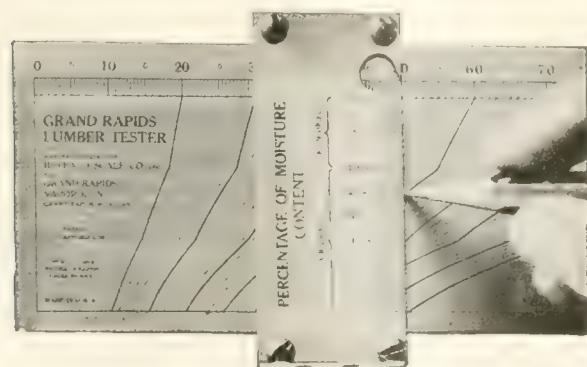
LABORATORY APPARATUS.

MOISTURE TESTER.

THE accompanying illustrations show an instrument in the form of a weighing scale for the determination of moisture in dried material. The instrument was designed for use in connection with the kiln drying of lumber, but is equally well adapted for any material the moisture content of which is desired. The instrument is simple and direct, reading requires no figuring. It



is accurately made, graduated to the metric system and can be used for ordinary weighing. To determine the amount of moisture in crude rubber, for example, a specimen is selected



and weighed as received; it is then completely dried by any suitable means, preferably vacuum dried for speed, and weighed again immediately. Following the chart line from first weight

to percentage scale at final weight will give the moisture content. The instrument has already found a place in the rubber industry. It is known as a lumber tester because of its initial adaptation. [Grand Rapids Veneer Works, Grand Rapids, Michigan.]

WATER-STILL.

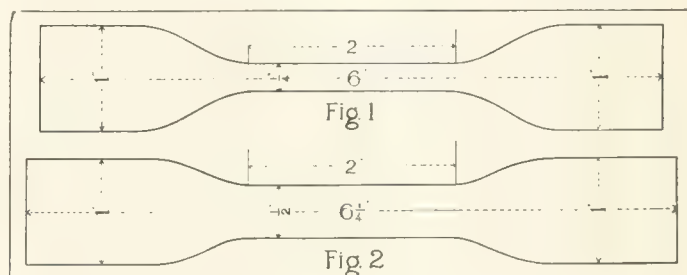


Absolutely pure water in laboratory practice is a necessity that is too well known to warrant comment. The obvious practicability of the apparatus here illustrated will make the following brief description of interest.

The Ralston water still is a simple and convenient piece of apparatus suited for laboratory use. The still is made of copper coated with pure block tin. It can be operated by an ordinary gas burner; size, 14¼ inches high and 9¼ inches diameter with a capacity of one quart per hour. [John Trageser Steam Copper Works, New York City.]

THE NEED OF STANDARDIZED TEST PIECES.

Standardization is now the order of the day and is particularly important in testing materials of every sort, if the results are to be so correlated as to benefit the entire industry concerned. In the manufacture of rubber goods the tensile strength of the



vulcanized product is commonly determined by stretch or breaking tests, yet the conditions under which these tests are made vary so greatly that exact comparison is virtually impossible and their full value is consequently not obtained. European testing machines as a rule call for rings, while the American specify strips, and unfortunately no uniformity exists with respect to the cross section, length and shape of the latter. Many factories would gladly revise their methods by the adoption of a standard practice were such available, and rubber technicians can do the industry a service in threshing out this matter and making recommendations.

It is the custom of the Bureau of Standards and several manufacturers of rubber goods to cut ¼-inch test pieces from vulcanized sheet 3/32 inches thick, the specimen having enlarged ends shaped as indicated in Fig. 1, and the elongation in the tension machines being taken between the 2-inch marks shown. Specimens of similar shape 6¼ inches long and ½ inch wide between the 2-inch marks, as shown in Fig. 2, are also in common use by certain manufacturers. Some firms die their test pieces out of 1/8-inch sheet, some prepare them by molding rather than cutting, and, generally speaking, there is an unfortunate lack of uniformity in shape and dimensions. The length of the straight part varies and the same may be said of the curves and other sections of the pieces, many factories having adopted their own patterns.

It is already conceded that strip tests do not involve certain

errors to which the ring is subject; also that greater uniformity throughout the narrow portion is had by punching away the sides of a flat strip of rubber sheet with a suitable die in a punch press, leaving the test portion between two stout ends for engagement by the grips of the testing machine, than by molding the specimens, careful as must the cutting be done to insure clean edges, as a tear will readily follow a slight check. There seems to be virtual agreement that the rate on tensile tests should be at 20 inches per minute movement of the stretching clamp, but beyond the three foregoing points uniformity ceases.

While the two sizes and shapes already illustrated and dimensioned are more commonly employed than any others, die makers are manufacturing a great variety of dies, mostly for use by mallet on a cutting block, but also plain tops for use under ordinary cutting presses and various forms of tops for insertion in other styles of presses. The straight part in the center of all is either $\frac{1}{4}$ or $\frac{1}{2}$ inch in width, but its length varies, as do also the curves of the grip ends where they reduce to the definite cross section of the sample. Both call for standardization, as Dr. Albert A. Somerville states that these curves have considerable influence on the test.

Here, indeed, is opportunity for scientific research, consultation and recommendation. It would seem that one of the two specimen shapes and sizes shown, together with a specified thickness, might meet the requirements, yet possibly a still better substitute might be evolved.

CHEMICAL ENGINEERS TO MEET IN BOSTON.

CHEMICAL engineers and manufacturers from all over the United States will gather in Boston on September 10, 11, and 12, to participate in the fifty-fifth annual convention of the American Chemical Society. It is estimated that over a thousand will be present for the event, in spite of the fact that many will be compelled to remain at home on account of war orders and the development of war time plans and experiments. It was intended that the convention would occupy the entire second week of September, but it has been determined on account of the serious times and the mobilization of militia during that month, to eliminate such features of the convention as the big banquet and other entertainments, excepting that a typical New England Shore dinner and a smoker will give the desirable touch of good-fellowship to the event.

The meetings will be held in the buildings of the Massachusetts Institute of Technology, Charles River Road, Cambridge.

Registration will be conducted at the buildings of the Massachusetts Institute of Technology, Cambridge, except on Monday, September 10, when it will be held at the Hotel Lenox.

Society headquarters will be at the Hotel Lenox at the corner of Boylston and Exeter streets.

The use of the Engineers' Club, at the corner of Arlington street and Commonwealth avenue, will be extended to all members of the Society.

The program is characterized by simplicity and seriousness, and bears as fully as possible on questions concerning the activities of chemists—both in the government service and in the industries during the war.

GENERAL PROGRAM.

Monday, September 10.

4.00 p. m., Council Meeting. Engineers' Club.

7.00 p. m., Dinner to the Council at the Engineers' Club (tendered by the Northeastern Section).

Tuesday, September 11.

10.00 a. m., General Meeting of the Society in the Massachusetts Institute of Technology.

Address of Welcome:

Dr. R. C. MACLAURIN, President Massachusetts Institute of Technology.

Response:

JULIUS STIEGLITZ, President American Chemical Society.

General Papers.

2.00 p. m., General Conference on Chemistry and Chemistry in Warfare, opened by WILLIAM H. NICHOLS, Chairman Committee on Chemicals, Council of National Defense. MARSTON T. BOGERT, Chairman Chemistry Committee, National Research Council.

5.00 p. m., Harbor trip to Hotel Pemberton, where an informal shore dinner and smoker will be held.

Wednesday, September 12.

Morning, Conferences of Divisions.

Afternoon, Divisional Meetings.

Evening, President's Address, Huntington Hall, Rogers Building, Massachusetts Institute of Technology, Boylston street.

Thursday, September 13.

Morning and Afternoon, Divisional Meetings.

ANNUAL MEETING OF THE RUBBER SECTION.

While the exact date has not been fixed, this meeting will probably be held on either September 12 or 13. The final program for the Rubber Section meeting will probably not be ready until about September 1, but the following tentative program will give some idea of the scope of the meeting:

Reports from the Chairman and Secretary on the work of the Rubber Section.

"A Volumetric Method for the Determination of Free Sulphur," by E. H. Johnson and H. S. Upton.

"The Direct Determination of India Rubber," by John B. Tuttle and Louis Yurow.

Symposiums:

The Best Methods for the Determination of Free and Total Sulphur.

The Use of Accelerators in the Vulcanization of Rubber.

The Rubber Chemist in the National Service.

A number of chemists have already promised to attend the meetings and enter into the discussion of these subjects, among others, L. E. Weber, E. H. Johnson, H. S. Upton, J. B. Tuttle, L. J. Plumb, C. R. Boggs, and D. Spence. Others who have been invited to speak include H. C. Pearson, W. C. Geer, Dorris Whipple, R. S. Postmontier, E. A. Barrier, Frederic Danerth, Earl Davis, Bertrand H. Hale, R. T. Stokes, J. P. Millwood, Donald Cranor and W. H. Cobb. Many of these men will be able to arrange matters so as to be present, and in that event will undoubtedly take part in the discussion. Dr. Spence is chairman of the sub-committee of the National Research Council on Rubber and Allied Products, and we are particularly eager to hear from him just what assistance the rubber chemist can be in the service of our country during the present crisis.

The object of the present announcement is to urge all of the rubber companies to see that matters are so arranged that their chemists will be able to attend this meeting. Everybody appreciates the value of rubber in modern warfare, but the fact remains that while we may have sufficient rubber for our needs, there is still a lot to be done in the way of standardization of supplies and equipment in such a fashion as to make the best possible use of our raw material. It is an assured fact that anything which the rubber chemists can do to be of assistance to the government in this matter will prove to be a valuable service, and one which it is both our duty and privilege to perform.

Last year, more than 100 rubber chemists attended the meeting of the Rubber Section in New York, and they were practically unanimous in expressing their opinion that the meeting was a most profitable one, and well worth attending. There is

no reason why this meeting should not be even better than the last. There is nothing which so tends to quicken our interest and increase our efficiency as meeting with our fellow chemists and exchanging ideas. The fact that every one is so busy is just the reason why we should take this opportunity of getting together and discussing subjects of vital importance to ourselves, our work, and our country.

The secretary has already received some names of those who wish a copy of the final program sent to them when it is issued, but if there are any others who also would like to have a copy it will be well for them to send in their names at once, since pressure of other matters in connection with his government work may render it impossible to comply with such requests if received at the last moment.

John B. Tuttle, Secretary,
Bureau of Standards,
Washington, D. C.
August 18, 1917.

L. E. Weber, Chairman,
729 Boylston street
Boston, Massachusetts.

A MEMORIAL TO JOSEPH PRIESTLEY.

The rubber industry will welcome the plan of the American Chemical Society to raise a fund of \$2,000 for a suitable memorial to Joseph Priestley, the English-American scientist and writer who discovered oxygen and gave caoutchouc the name rubber because it will erase pencil marks. It is proposed to secure a copy of the best available bust portrait to be deposited as a loan in the National Museum, Washington, D. C., and at intervals of a year or more to award Priestly gold medals for superior achievement in chemical research. The matter is in the hands of a notable committee of fifteen, of which F. C. Phillips, University of Pittsburgh, Pittsburgh, Pennsylvania, is chairman. Contributions from \$1 upwards are solicited.

THIRD NATIONAL EXPOSITION OF CHEMICAL INDUSTRIES.

IT is the belief of those in charge of the Third Annual National Exposition of Chemical Industries, which will be held at Grand Central Palace, New York City, during the week of September 24, that the affair will be the greatest ever held.

Monday, September 24, at 2 P. M., opening addresses will be made by Dr. Charles H. Herty, chairman of the advisory committee of the exposition and editor of the "Journal of Industrial and Engineering Chemistry;" by Professor Julius Stieglitz, president of the American Chemical Society; Dr. Colin G. Fink, president of the American Electrochemical Society, and Dr. G. W. Thompson, president of the American Institute of Chemical Engineers.

Among the speakers on the program for other days are W. E. Kies, vice-president National City Bank, "The Development of Export Trade with South America"; Professor Marston Taylor Bogart, chairman chemistry committee National Research Council, "The Operation and Work of the National Research Council for the National Weal"; Dr. L. H. Baekeland, of the Naval Consulting Board, "The Future of American Chemical Industry."

In a symposium on "National Resource as Opportunities for Chemical Industries" the speakers will include C. H. Crawford, assistant to president of Nashville, Chattanooga & St. Louis Railway; V. V. Kelsey, chemist-industrial agent Carolina, Clinchfield & Ohio Railway; Dr. E. A. Schubert, mineralogist-geologist Norfolk & Western Railway; Dr. T. P. Maynard, mineralogist-geologist Central of Georgia Railway and Atlantic Coast Line Railway, and Dr. J. H. Watkins, geologist Southern Railway.

The motion picture program will be one of wide interest. The American Cyanamid Co. and General Electric Co. have already arranged to supply their films. The Bureau of Commercial Economics at Washington will also supply many toward completing the range of industrial films.

The purposes of the exposition are not so much to show the progress made in all the chemical industries as to indicate where progress can be made, and where opportunities await development, and how our national resources and wastes can be made valuable and useful. It gives the man of science, the financier, manufacturer and plant operator the opportunity of personal contact with the latest machinery, materials and products used and applied in all the chemical industries, and the opportunity of learning how they can be applied to his specific purposes.

RUBBER TRADE INQUIRIES.

THE inquiries that follow have already been answered; nevertheless they are of interest not only in showing the needs of the trade, but because of the possibility that additional information may be furnished by those who read them. The editor is therefore glad to have those interested communicate with him.

[320.] Manufacturers of elastic garter webbing are sought.

[321.] A correspondent seeks information on a method for compounding rosin to take the place of shellac.

[322.] An inquiry has been received for a machine for applying labels to cartons.

[323.] A concern that buys uncured friction reclaim is sought.

[324.] Names and addresses of manufacturers of small laboratory centrifuges for latex coagulation have been requested.

[325.] An inquirer desires to secure machinery for making rubber bands.

[326.] A correspondent wishes to be put in touch with a manufacturer of cellulose acetate.

TRADE OPPORTUNITIES FROM CONSULAR REPORTS.

A mercantile and manufacturing company in Italy desires to purchase imitation leather valises. Report No. 25,019.

A merchant in Newfoundland wishes to purchase rubber protectors, rubber tissue, and other haberdashery used in the tailoring business. Report No. 25,110.

A firm in the United States representing a company in Spain is in the market for rubbers and overshoes. Report No. 25,113.

An agency for the sale of suspenders and garters is sought by a firm in India. Report No. 25,127.

An applicant in Algeria wishes to purchase rubber erasers and bands. Report No. 25,144.

A company in Brazil is in the market for low-cut rubbers for men. Report No. 25,148.

Representation of American manufacturers of all kinds of artificial leather is desired by a merchant in Australia. Report No. 25,187.

A manufacturers' agent in Newfoundland wishes to secure an agency for the sale of fine rubber goods in soft and hard rubber, mechanical rubber goods for railroads, etc. Report No. 25,206.

A firm in British East Africa wishes to buy bicycle tires 28 by 1½ inches, with a straight ribbed tread running with the tire; 4,000 to 5,000 of these tires can be used annually, as well as inner tubes for same. Report No. 25,227.

A firm in Brazil wishes to represent American manufacturers and exporters of rubber goods and textile machinery. Report No. 25,238.

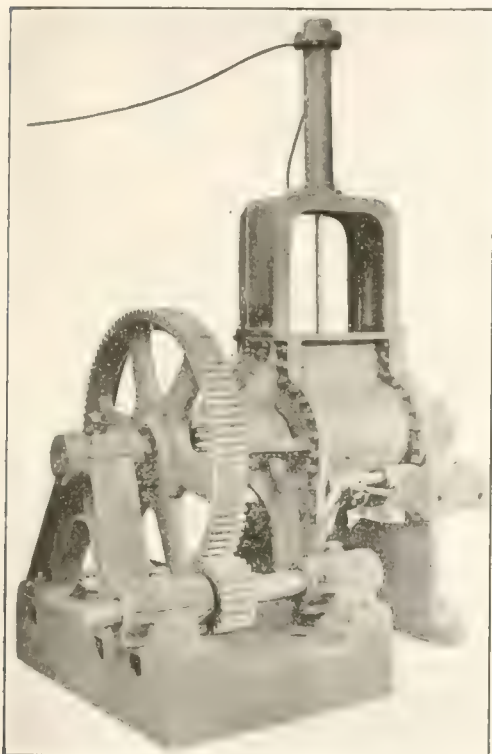
AFRICAN RUBBER AVAILABLE.

A consular officer in British East Africa reports that several concerns in that country are prepared to furnish rubber in specified quantities for shipment to the United States. American concerns interested may secure the names and addresses of such firms from the Bureau of Foreign and Domestic Commerce, or its district or cooperative offices, by referring to file No. 91,462.

New Machines and Appliances.

THE BANBURY AUTOMATIC MIXER.

PROGRESSIVE builders of rubber machinery are constantly studying the rapid advancement of rubber mill practice with the object of developing the necessary machines that will meet



the mechanical requirements of present-day methods. That such inventive effort has been productive in evolving a mixing machine of novel design and proven efficiency is shown in the accompanying illustration.

This machine is adapted to break down the rubber and mix the compounding ingredients at the same time; in fact, it is capable of performing the work usually done on the 48-60 and 84-inch, two-roll mixing mills. It is es-

entially an enclosed machine, comprising two revolving blade shafts that rotate in individual cylindrically-shaped troughs, the bottom of which forms a door through which the finished stock is discharged. The stock is kept under pressure by a weight that is controlled by the vertical shaft and ram located above the feed hopper, thus assuring uniform feeding during the mixing operation. The mixer may be driven by direct gearing from the mill shaft or by individual motor drive, and in some cases chain drive is preferred.

In operation the rubber and compounding ingredients may be dumped into the machine while it is running. However, with some compounds it is preferable first to break down the rubber and then add the ingredients, the subsequent action of the machine being entirely automatic. When the batch is thoroughly mixed, the bottom door is opened and the load is automatically discharged, the mixer being ready for the next batch within a fraction of a minute.

Uniformity of product is the principal advantage claimed for this machine as it will always do an equal amount of work for the same number of revolutions, that is to say, for the same time. It is the machine and not the operator that controls the actual mixing operations. Another advantage due to the enclosed construction of the machine is that of cleanliness when compounds containing lampblack or gasblack are milled. [Birmingham Iron Foundry, Derby, Connecticut.]

SOUTHWARK QUICK OPENING VULCANIZER DOOR.

The accompanying illustration shows a new vulcanizer door of the quick opening type that possesses, in connection with unusual facilities for easy handling, the quality of being explo-

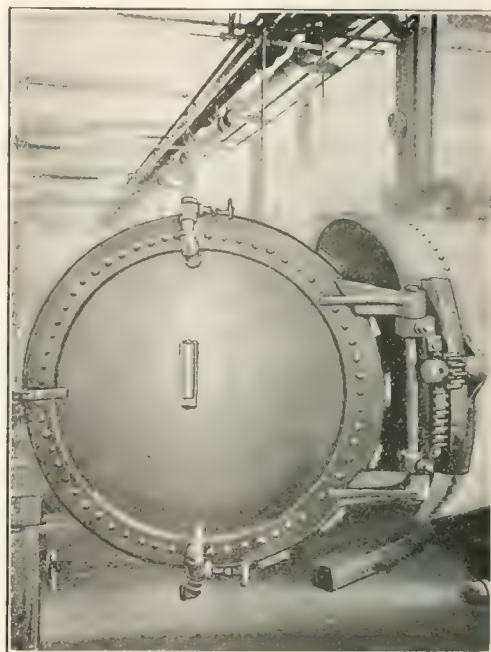
sion-proof. In the old type vulcanizer head provided with swinging bolts, should a few of these bolts become loose, as often happens, the other bolts are thrown out by the internal pressure and the door opens violently, causing an explosion. The locking mechanism of the Southwark door, however, is of the breech-lock type and constructed so that when the cover is shifted the taper on the lugs lifts the lid sufficiently to admit air, thus preventing the possibility of an explosion.

The door is opened quickly with very little effort, by means of

a rack and pinion mechanism that is operated by one man and shown in the illustration. Connections are provided in the head for attaching temperature and pressure gages.

All castings are made from open hearth steel and the dished part of the door is boiler plate.

Where vulcanizer doors of the swinging bolt type are used, this style of door can easily be installed by making a special locking ring which may be bolted to the existing ring that is riveted to the shell. [Southwark Foundry & Machine Co., Philadelphia, Pennsylvania.]

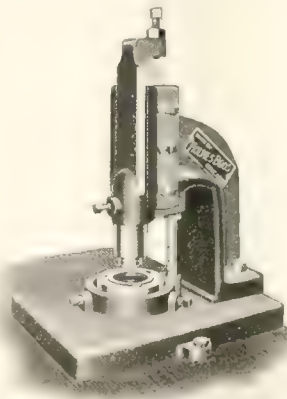


THE HOLMES OVERFLOW TRIMMER.

The labor expense connected with trimming the overflow from mechanical rubber goods is an item of considerable importance where large quantities of standard goods are made. The operation

should be quickly and accurately performed and in this respect the trimmer here shown is fully guaranteed by the makers.

The machine is of the foot-power, punch-press type adapted to be mounted on a bench or table. It is especially designed for trimming small mold work, such as fuller balls, disks, bumpers and articles of regular or irregular shapes. The question of accuracy in trimming is definitely de-

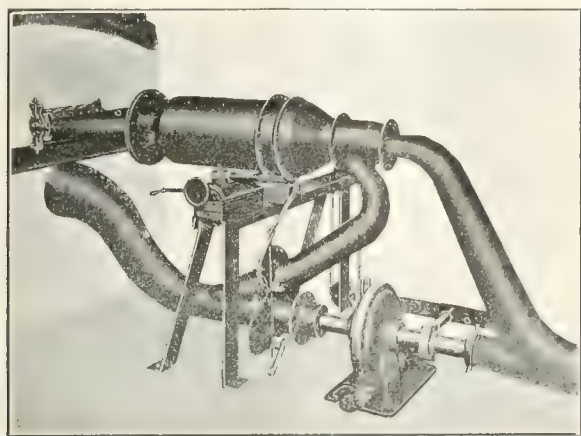


termined by the use of punches and dies that are carefully constructed to conform to the shape of the article to be trimmed. The construction and simplicity of the press permit the turning out of a maximum product by an operator of ordinary skill and intelligence. [Holmes Brothers, 500 South Peoria street, Chicago, Illinois.]

THE PRUDEN POWDERED COAL CARBURETER.

The fuel problem is one that is now forcibly being brought to the attention of industrial executives the world over. With the price of coal reaching abnormal levels, the large consumers are confronted with greatly increased cost of power production. The solution appears to be in the use of low-grade coals and to that end a mechanical device for the utilization of powdered coal has been evolved.

In the mechanical application of the Pruden carbureter, the air and powdered coal are intimately mixed and the mixing



intensified in its travel through the burner to the combustion chamber of the furnace. Here the chemical combination of the oxygen of the air and the fuel elements of the powdered coal takes place, resulting in perfect and instantaneous combustion.

The engineering problem of the adaptation of powdered coal as a fuel to a particular plant is first worked out by specialists in a research laboratory by means of a demonstration plant provided for that purpose. The results thus obtained establish on a proven basis the equipment and installation required. [Powdered Coal Engineering & Equipment Co., 2401-21 Washington boulevard, Chicago, Illinois.]

THE STRATTON STEAM SEPARATOR.

The Stratton steam separator shown in the accompanying illustration is designed for the removal of water from steam, and it is particularly recommended to rubber manufacturers for use on the steam inlets of vulcanizers.



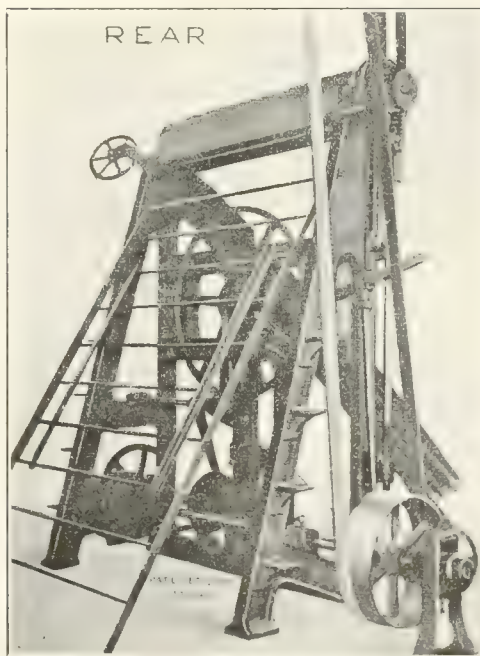
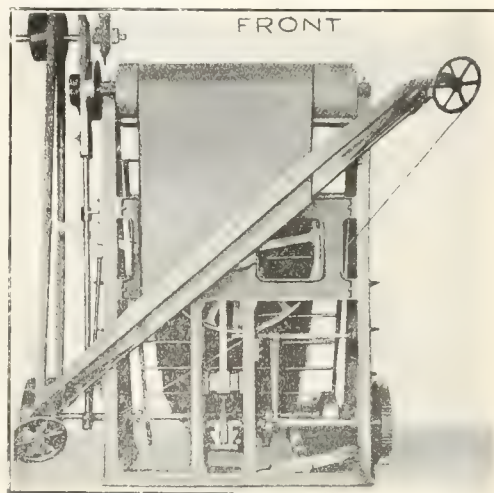
This separator utilizes centrifugal force as the means of separating the water from the steam. As the steam and water enter the separator they are caused to pass through a spiral path formed about a central core. The sudden change from a straight line flow to this spiral path imparts a whirling motion to the steam and water. Water is 200 or 300 times heavier than steam, and therefore does not turn corners as easily. At any turn the centrifugal force throws the water against the wall forming the bend, while the steam makes the turn and goes on without the moisture. With a properly formed bend, large or small quantities of water will swing out of the curving steam current, meet the wall at an angle, and slip smoothly along without the slightest spatter or splash, following closely to the wall until the motion dies out.

Thus complete removal of water from the steam is secured and

the vulcanizer receives only dry steam. [The Driscoll-Russell Co., 90 West street, New York City.]

THE BOLTON VERTICAL BIAS CUTTER.

Bias fabric cutting machines are very important and most necessary in the making of various rubber goods, particularly in the manufacture of pneumatic tires, footwear and mechanical goods. The standard, horizontal bias-cutter is the type generally used in cutting the strips of frictioned fabric that are used in rubber goods manufacture. As a radical departure in design, construction and operating principle the vertical machine here illustrated presents a variety of



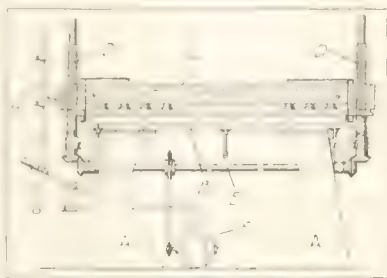
novel and interesting features. In operation the roll of frictioned fabric is placed in the take-off bearings arranged at the back of the machine and the end of the fabric is run between the tension rollers while the liner is wound up on a power driven roller provided for that purpose. The fabric is then passed over the feed roller at the top of the machine and down the front

to the diagonal clamping and cutting device shown in the front view of the machine and which may be adjusted to any required angle. The cutting is performed by a shuttle-like knife that is reciprocated by a rack and pinion gearing driven from the main shaft. As the fabric is intermittently advanced a predetermined distance by the top feed roller the fabric is firmly held by the clamping device while the reciprocating knife cuts off the strips in successive regularity. The machine occupies a very small floor space. In fact a machine to cut 60-inch cloth on a 60-degree angle occupies a space of 9 feet by 5 feet with head room of 14 feet and requires no foundation for its support. Its accuracy is guaranteed and the cutting knife may be changed within a few moments. Two men are required for its operation. [The Gutta Percha & Rubber Manufacturing Co., 126-128 Duane street, New York City.]

MACHINERY PATENTS.

DEAD WEIGHT MOLD PRESS VULCANIZER.

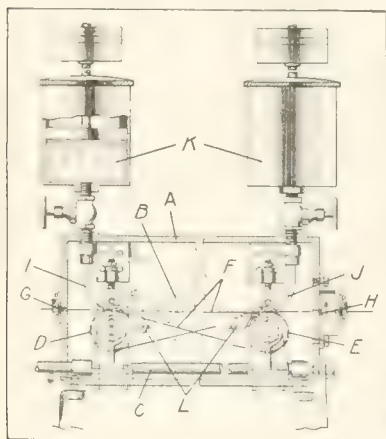
TO avoid the possibility of excessive pressure in mold curing and the consequent damage to the molds is the principal object of the invention here illustrated. The machine is shown in vertical section with a few molds in position between the platens. Two standards *A A* rigidly support the bottom platen *B*, while the movable upper platen *C* is raised and lowered by two vertical screws *D D*, geared by miter gearing to the shaft *E*, driven by motor *F*, both platens being chambered for steam. The end lugs of the upper platen are provided with square holes and loosely fitted to the square brass nuts that are threaded on the vertical screws. The bottoms of the nuts are flanged to engage the under sides of the lugs.



To raise the upper platen the belt-crank lever *G* is pulled down, starting the motor, the brass nuts are advanced by the revolving vertical screws and the flanges of the nuts engage the lugs, thereby raising the platen. Connected to the lever *G* is a sliding rod *H*, provided with two stops, the purpose of which, briefly stated, is as follows: When the platen is free from the molds the upper stop contacts with a projection on the lug, thereby raising the starting lever and stopping the motor. When the starting lever is raised the motor reverses and the platen is lowered until it rests on the molds. By this time the lug projection has come in contact with the lower stop, thereby lowering the starting lever and stopping the motor. Thus it will be seen that the platen rests on the molds with its own weight, the molds being all of the same thickness and the platen of sufficient weight to afford the required pressure. [Christian Hamilton Grey, Essex, England. United States patent No. 1,234,330.]

FABRIC BAND STRETCHING AND COATING MACHINE.

A band of fabric is formed, compressed, stretched and coated with rubber solution in a heated vacuum chamber and finally passed through a cooling chamber, according to this invention.

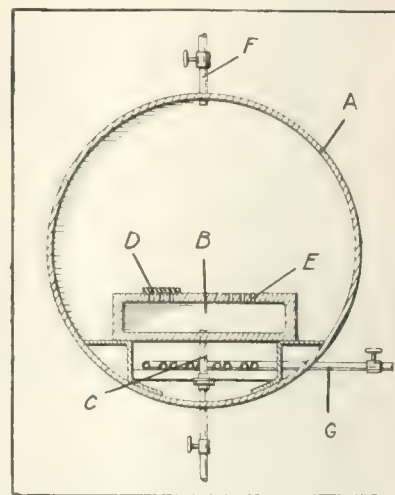


The band enters through an automatically closing gate *G* and passes out through the double gate *H*.

Rubber solution is applied to the band through nozzles *I* and *J* from solution tanks *K* that are provided with weighted pistons for positive feeding. Adjacent to each drum are scraping devices *L* that remove the surplus rubber. The band is passed through a cooling chamber, not shown, in which a blast of air cools and hardens it so that it may be handled. [Lawrence A. Subers, East Cleveland, Ohio, United States patent No. 1,234,704.]

RUBBER SOLE VULCANIZING AND EMBOSSEING APPARATUS.

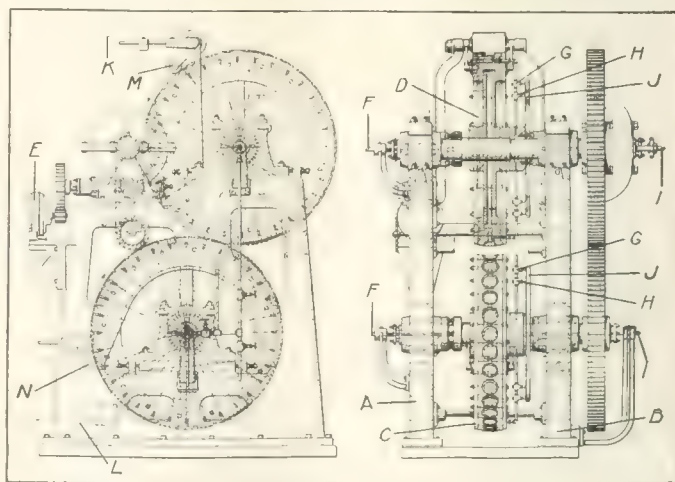
In this invention rubber soles are subjected to both heat and pressure in a vulcanizer and at the same time the design is imprinted on the tread surfaces of the soles. Referring to the illustration, which is a cross section of the apparatus, *A* represents the vulcanizer, and *B* a removable table formed with a hollow chamber that is connected to an exhaust pump by pipe *C*. The upper part of the table is provided with engraved outlines forming the tread designs and the shapes of the soles, one of which, *D*, is shown in place. Connecting channels in the design molds communicate with air ducts *E* that open into the hollow chamber of the table.



When the soles are placed in the vulcanizer and alined with the design molds, air under pressure is admitted at *F*, which presses the soles flat and embosses the treads. At the same time, the air is exhausted from the chamber in the table, the entrapped gases, fluids and moisture are forced out of the soles. Heat is then admitted to the vulcanizer through pipe *G*. [Clifford Lee, assignor to Goodyear's Metallic Rubber Shoe Co.—both of Naugatuck, Connecticut. United States patent No. 1,232,573.]

MACHINE FOR MAKING HOLLOW RUBBER ARTICLES.

In the accompanying illustrations a side view and sectional elevation are shown of one form of this invention, namely, a machine for making hollow rubber balls. It is supported on a base plate by two standards *A* and *B* and comprises two wheels *C* and *D* of similar diameter that are journaled in suitable bear-



ings and driven at uniform speed by a motor *E*. The upper wheel is offset from the vertical plane that passes through the axis of the lower wheel and in the periphery of each wheel are arranged the upper and lower mold halves with cutting and pressing edges that form the completed balls. The rims of the wheels are chambered for steam that is supplied through pipes *F*. Each cavity is provided with suction or vacuum openings connected by pipes to release valves *G* and vacuum valves *H*, supplied through pipes *I*, the flow of air to and from the molds being regulated by these valves which are automatically operated by cam rings *J*.

When the wheels are revolved in the direction indicated by the arrows, two strips of uncured stock *K* and *L* are fed to the upper and lower wheels, respectively, passing around guide rollers and under idler rollers *M* and *N*, causing the strips to adhere to the peripheral molds. The cam rings depress the suction valve stems and the strips of stock are drawn into the mold cavities when a pill of chemical material that will gasify under heat is automatically dropped into each of the lower molds. As the two wheels meet, the two strips of rubber are forced together at the edges of the cavities and the edges severed from the strip, when the action of the cam releases the vacuum and applies pressure in each cavity, the completed balls remaining in place until they are freed by their own weight. They are then placed in molds and vulcanized in the usual manner, when the gases produced by the action of heat on the chemical pills serves to expand the balls within the molds. [James W. Brundage, assignor to The Miller Rubber Co.—both of Akron, Ohio. United States patent No. 1,232,764.]

OTHER MACHINERY PATENTS.

THE UNITED STATES.

- 1,234,065. Vulcanizer for rubber tires. C. E. Miller, Anderson, Ind.
- 1,234,431. Vulcanizing press. B. F. White, Rock Island, Ill.
- 1,234,526. Machine for treating rubber and other heavy plastic material. I. H. Banbury, Ansonia, Conn., assignor to Birmingham Iron Foundry, Derby, Conn.
- 1,235,117. Repair vulcanizer. Marion X. Corbin, Savannah, Ga.
- 1,235,226. Machine for cutting disks of cork or similar material. A. Minnemann, Delmenhorst, Germany.
- 1,235,757. Machine for treating rubber and other heavy plastic material. I. H. Banbury, Ansonia, Conn., assignor to Birmingham Iron Foundry, Derby—both of Conn.
- 1,236,963. Tire skiver. B. E. Maxwell, Wichita, Kan.
- 1,237,131. Method of manufacturing reinforced inner tubes and mandrels therefor. H. G. Welch, Philadelphia, Pa.

THE DOMINION OF CANADA.

- 176,340. Machine for building tires. The Miller Rubber Co., assignee of F. F. Brucker—both of Akron, Ohio, U. S. A.
- 176,363. Repair vulcanizing core. W. L. Heenig, Marion Johnston and E. W. Ohls, assignees of a third interest—all of Denver, Colorado, U. S. A.

THE UNITED KINGDOM.

- 106,242. Vulcanizer. Soc. Pour La Production & La Vente Des Articles en Caoutchouc "Bogatyr" and J. A. Talalay, Bogatyr, Moscow, Russia.
- 106,320. Machine for folding canvas strip for engine packing. G. Warwick, 80 Cobham Road, Seven Kings, Essex, and A. P. Crouch, 106 Cannon street, London.

PROCESS PATENTS.

THE UNITED STATES.

- 1,234,381. Plastic material and process of producing same. S. J. Peachey, Heaton Mersey, near Manchester, England.
- 1,235,052. Manufacture of tires. R. E. Price, New York City, assignor to Rubber Regenerating Co., a corporation of Indiana.
- 1,236,049. Process of making rubber-coated leather articles. J. H. Butler, assignor of one-half to F. W. Austin—both of Gloversville, N. Y.
- 1,236,183. Coating composition and process of making the same. H. K. Kiss, New York City.
- 1,236,235. Mollifier or comforter. A. R. Tufts, Vancouver, British Columbia, Canada.
- 1,236,685. Process of manufacturing waterproof leather and the like. J. W. H. Dew, London, England.
- 1,237,227. Cushion tire and method of making the same. J. L. Swartz, Akron, Ohio.

THE DOMINION OF CANADA.

- 176,205. Process of compounding rubber and fabric. The Standard Woven Fabric Co., Framingham, assignee of F. J. Gleason, Walpole—both in Massachusetts, U. S. A.

THE UNITED KINGDOM.

- 106,270. Plastic compositions. E. Krause, 6 Sedanstrasse, Steglitz, Berlin, and H. Blucher, 1 Kanalstrasse, Gohlis-Leipzig, Germany.

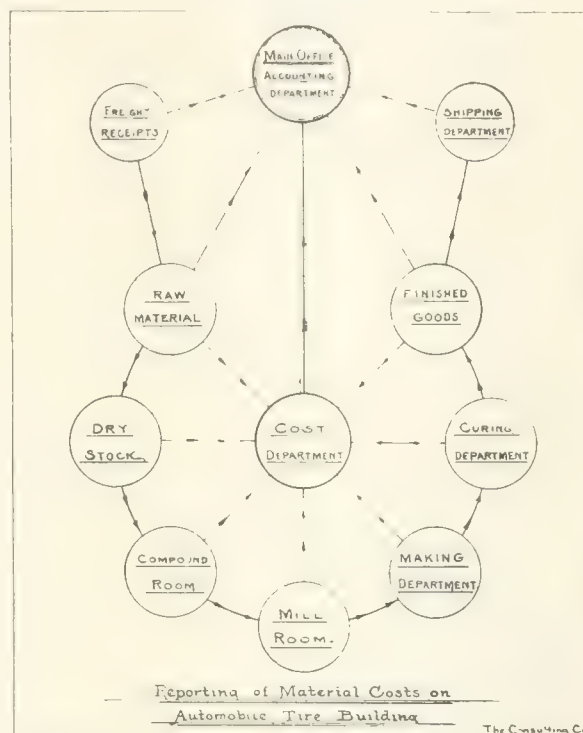
THE FRENCH REPUBLIC.

- 483,062 (September 30, 1916). Process for the manufacture of articles containing elements formed by a plastic and a fibrous material. The Rubber Regenerating Co.
- 483,064 (October 2, 1916). Armored plastic material. G. Couvert.

RAW MATERIAL COST ACCOUNTING IN TIRE FACTORIES.

The accounting of labor costs has in the past received considerable attention and study, with the result that labor cost figures are not difficult to compute. This is particularly true now that piece work prevails in so many factories. The progressive cost of raw materials, however, has not been given the consideration or thought that this important factor in manufacturing really deserves. For that reason the following diagram and explanation are of interest:

The smaller rubber factories rarely give enough credit to wastage in their cost accounting. Raw material, of whatever nature, in rubber manufacture, is undergoing a constant shrink-



age from the day the car is unloaded to the time the finished product is shipped. It is possible in time, from previous experience, to estimate a predetermined percentage for shrinkage as material passes through the various departments. But to check this predetermined shrinkage a system of reports should be made to the cost accounting department, and rigidly adhered to, thereby stopping many a leak before it reaches the proportion of a flood and finally becomes disastrous.

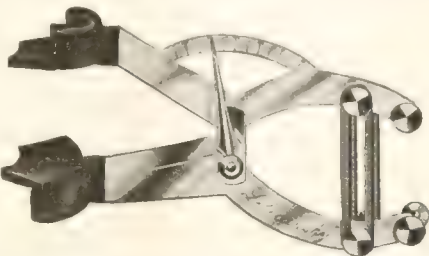
Referring to the diagram, the solid lines between the departments are represented by circles and indicate the travel, step by step, of the material through the various processes into the finished product. The dotted lines, between the departments and cost department represent a system of reports that are made to the cost department or main accounting department, as the case may be, covering what passed out of the particular department making the report, and to which department the material reported upon was delivered.

Thus the main office accounting department would have absolute control of factory costs through an accurate system of accounting that would show the cost of raw materials consumed in production, with full consideration of the shrinkage in process. [The Consulting Co., Cincinnati, Ohio.]

New Goods and Specialties.

APPLIANCE FOR MAXILLO-FACIAL MECHANOTHERAPY.

IN a recent number of "The Dental Cosmos" appears an interesting article by Emile Linet on a new appliance for maxillo-facial mechanotherapy, to overcome contractures of the mandible. The appliance, shown herewith, consists of two levers of the first class connected together at the fulcrum point. One end of each lever bears a small, strong tray, into which fits a piece of soft rubber to protect the teeth. The other end of each lever, *i. e.* the "force" end, bears two pairs of knobs which serve for the attachment of elastic rubber bands. Such bands, of known strength, are supplied with the appliance. The superior lever carries a scale, upon which a pointer upon the lower lever registers in millimeters the vertical distance between the two trays, *i. e.* the separation distance of the jaws.



The action of this instrument can be definitely measured and controlled and tends gradually to reduce and finally eradicate contractures, whether of cutaneous, articular or muscular origin. [The S. S. White Dental Manufacturing Co., Philadelphia, Pennsylvania.]

VULCANIZED RUBBER HAIR-PARTER.

A simple device which enables the user to be independent of a mirror and to part the hair easily and with exactitude consists of two flat strips of vulcanized rubber which may

be bent lengthwise to conform with the shape of the head. These strips are pivoted together, edge to edge, so that either strip may be swung around independently of the other. The strips are laid with their confronting edges along the line where the part is to be made. One strip holds the hair down on an imaginary line, while the other sweeps the free hair to one side, making a straight and even parting. [James Maxwell,



Senior, 108 West Forty-third street, New York City.]

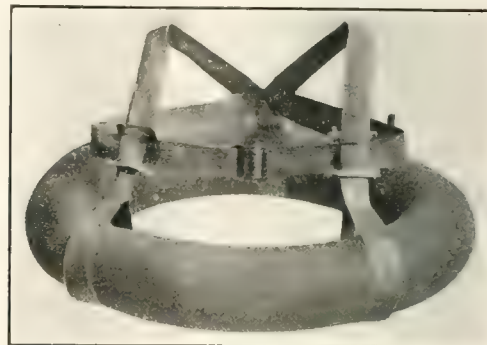
SILUMINITE: A NEW INSULATOR.

This new insulating material is a hard black substance, ringing like slate, but of far greater strength; it can be sawn, filed, drilled, tapped, turned, and polished with ease, and can be molded to any shape in the course of manufacture, but not afterwards. It is not softened by heat (it is subject to a temperature of more than 600 degrees F. at the makers' works) and is not brittle. Immersion in oil or caustic alkali, or boiling water, leaves it unchanged, and it is non-hygroscopic. It possesses high dielectric strength, this being between 10,000 and 13,000 volts per millimeter. Its structure is homogeneous and dense, the weight of a square foot $\frac{1}{4}$ -inch thick being 2.4 pounds.

Metal parts can be insulated by compressing Siluminite on them in any desired shape, thus avoiding the cementing or screwing process now necessary in most cases. The substances with which it will most directly compete are porcelain, glass, mica, fiber, ebonite, wood, slate, marble and molded compounds. It is supplied in the form of rods, sheets, tubes and various molded specialties. [The Siluminite Insulator Co., Limited, Southall, London, England.]

THE "KANTSINK" SWIMMING HARNESS.

The beaches are thronged with bathers, the majority of whom cannot swim, yet are eager to learn, and a trustworthy aid that does not cumber the would-be swimmer's movements should find a ready market. In the apparatus shown in the accompanying illustration a rubber tube is fastened to the body with one buckle and traveling loops that permit perfect adjustment. The "Kantsink" swimming harness is made in two regular sizes, one for children up to 16 years and the other for men and women up to 40-inch bust measure. Extra large sizes are also furnished, if desired. [Kant Sink Swimming Harness Co., Traverse City, Michigan.]



RUBBERIZED SHARKS.

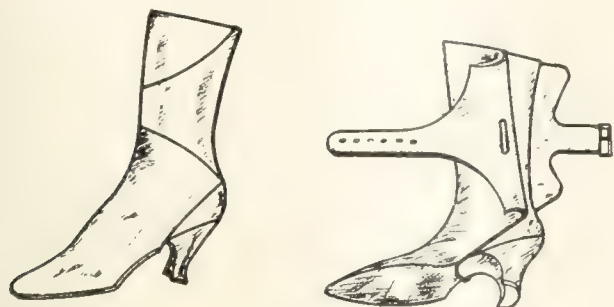
Sharks of such gentle disposition that feminine bathers may ride them over the waves are the latest seashore diversion, taking the place of the familiar surf-board. This ferocious appearing but harmless semblance of the man-eater that ter-



rorized the Atlantic coast last summer is made of rubberized fabric, inflated with air. It is light in weight and can be easily carried, yet it will support an adult and provides a means for the performance of many clever and thrilling water "stunts."

SANDAL GAITER WITH RUBBER SOLE.

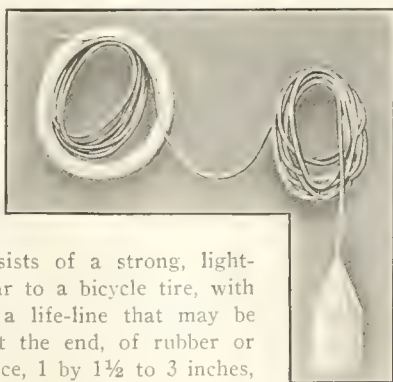
A neat appearing sandal gaiter, shown herewith, is made with an all white rubber sole with white duck top, or red rubber sole and tip, or all black, and a top of tan duck or other storm-proof material. It is a combination of a sandal overshoe and



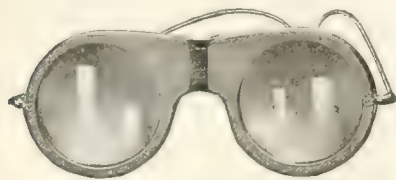
an over-gaiter, and protects the fine cloth tops of shoes, or silk hosiery when worn with low shoes, also acting as a new top for shoes that are partly worn and misshapen. This sandal gaiter is easily slipped on and fastened and, it is claimed, will fit any size ankle. As it can be folded and carried in a hand-bag or coat pocket it affords a convenient accessory to the traveling wardrobe. [The Styles Resurrection Co., Trenton, New Jersey.]

THE NELSEN DIVING LINE BUOY.

In drowning accidents would-be rescuers are frequently drawn under water by the victim, resulting in a double tragedy. Many times, also, bathers are drowned in the surf where a boat cannot reach them. The diving line buoy here shown is designed to meet all difficult situations in rescuing the drowning and to be carried as part of the regular equipment of boats, ships, yachts, etc., and at life saving stations, piers and docks. It consists of a strong, light-weight rubber tube, similar to a bicycle tire, with valves for inflation, and a life-line that may be 100 feet long. A tube at the end, of rubber or metal, has an inflating space, 1 by 1½ to 3 inches, inflated in the same way as a punching bag. This is 16 to 18 inches in diameter, and the smaller this tube, the farther it can be heaved. [Nelsen & Woods Manufacturing Co., 425 First National Bank Building, Long Beach, California.]

**"FYBER-WELD" GOGGLES FOR WELDERS.**

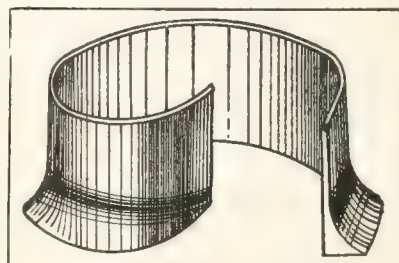
The protecting goggle is a very essential part of the welder's outfit, his safety frequently depending on the defense of his eyes from flying sparks. A goggle specially designed for this purpose is called the "Fyber-Weld." The frame is made of vulcanized fiber that is claimed to be an absolute non-conductor of heat and electricity, and the composition, although light in weight, is so strong that the goggle frame can even be thrown without breaking. Side pieces are of the ventilating type and the center is of soft, flexible leather. An adjustable elastic band allows the goggle to be comfortably and securely fastened to the head. The illustration shows the spectacle type of eye shield,



preferred by many, embodying the same principles and having rubber-covered cable temples. [Chicago Eye Shield Co., 2300-2304 Warren avenue, Chicago, Illinois.]

"CROGOFF," A NEW GAME.

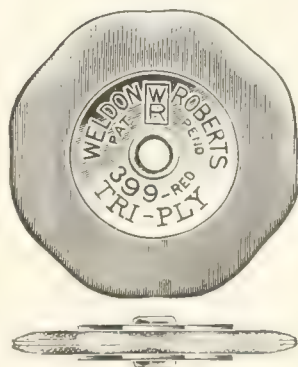
A game combining the principles of croquet and golf utilizes a device resembling the numeral 6 in shape and having upright walls and a thickened base provided with rubber to prevent slipping. This is called a "coop" and in playing the game golf balls are driven into it by putters. The outfit consists of nine coops, two golf putters and two balls. The coops may be set up on a lawn, a room floor or the deck of a vessel, the rubber base holding them



securely to the surface, dispensing with the necessity of nails, screws or pegs. The formation of the coop allows the ball to enter and remain, thus taking the place of a hole socket. "Crogoff" is recommended as an ideal game for wounded soldiers. [The "Crogoff" Co., 123 Rotton Park road, Birmingham, England.]

RUBBER TUBE WATER FILTER.

The dangers of contaminated drinking water are well known, and soldiers, travelers, fishermen, hunters, etc., are apt to be placed in the uncomfortable position of going thirsty or running the risk of contagion. A device designed to remove this risk and render any water safe to drink consists of a slender tube of stout white rubber, with a red rubber cup at one end which is plugged with antiseptic cotton. The cup end of the tube is placed in the water, which is then drawn through the tube by suction. This automatic filterer is so small that it can conveniently be carried in the pocket. [The Ideal Rubber Co., Los Angeles, California.]

**TRI-PLY COMBINATION ERASER.**

Edge view showing inlay.

The special feature of this eraser consists of a combination of two grades of rubber, adapting it for use on all kinds of paper. In erasing typed matter on manifolds or other delicate sheets the ordinary eraser, suitable for use on a heavy, hard-surfaced paper, does not effect its purpose satisfactorily. Composed of a three-ply stock with a thin layer of harder grade rubber and two outside layers of soft, pliable rubber, this eraser has only to be turned at right angles to the paper when erasing on

heavy sheets or at an angle of 45 degrees for the thinnest tissue in order to bring the proper part into play. The saving in time and annoyance to the user is self-evident, and the irregular hexagon shape is of further value in effecting difficult erasures. This handy office accessory is listed by the maker as No. 399. [Weldon Roberts Rubber Co., Newark, New Jersey.]

THE NATHAN COMFYKIT.



A durable and compact container for the many small articles in daily use by travelers, soldiers and sailors, is shown in the Nathan Comfykit. The case is made of two-ply rubberized auto cloth in olive-drab, neatly bound, and with many pockets for the various articles, which are 18 in number and range from a safety razor to safety pins. The kit, when opened, is 22½ by 9 inches and when folded, occupies space measuring 9 by 5 by 2¾ inches. Its weight complete is only 24 ounces. [Nathan Novelty Manufacturing Co., 84 Reade street, New York City.]

HEAVY ELASTIC AVIATION CORD.

The use of metal springs or other appliances in airplane construction, intended to resist the sudden shock of landing, has proven ineffectual for the purpose, and designers of modern airplanes have



tried various expedients with unsatisfactory results. It is due to the remarkable quality of india rubber that specially constructed heavy elastic cords are successful in heavy airplane construction to secure the cushioning effect when landing.

The wheel supports, at both front and rear of the machine, are provided with steel tubes that slide within each other. The rubber cords supply the necessary tension to the sliding supports, so that when the machine is on the ground the weight is cushioned by the tension of the rubber cords and when flying they are relaxed.

The standard cord is 9/16-inch in diameter, the core being composed of many square rubber threads laid parallel to each other and enclosed in a braided-on cover composed of hard-twisted yarn. Sixteen of these strands are generally used to a machine, but that depends, however, on the weight and style of the airplane. [J. W. Wood Elastic Web Co., Stoughton, Massachusetts.]

QUICK TIRE SERVICE, INC.

The Quick Tire Service, Inc., Louisville, Kentucky, has taken over the distribution of United States tires exclusively and has moved into new quarters at Third and Kentucky streets. The building is two stories high and contains 14,000 square feet of floor space. In every detail it is arranged to give prompt tire service to consumers, a special feature being its accessibility on all four sides. A. Craig Culbertson, formerly manager of the Compression Tube Co., succeeds C. T. Ballard, Jr., as manager, and Andrew Hunnicutt has been made assistant manager.

GERMANY EXTOLS RUBBER SUBSTITUTE GLOVES.

In a German publication (Silberstein and Colman, Zentralbl. f. Chir., 1916, No. 1) we read that the obvious disadvantages of rubber gloves—namely, their relatively high cost and poor wearing qualities—have led to search after efficient substitutes, one of which consists of a new preparation called "Sterilin," an organic ester which is applied to the hands in liquid form. Drying takes place in a few minutes, leaving a transparent, non-sticky coating impervious to bacteria and unattacked by benzin, oils, dilute acids, corrosive sublimate, blood, or pus, yet readily soluble in a preparation accompanying the outfit, or in acetone. It is said that antiseptic substances may be incorporated to increase the aseptic qualities of the preparation.

This sounds very fine, but we hazard the guess that the shortage of suitable rubber, not disadvantages of rubber gloves, led to the search for this substitute, and that with the coming of peace the merits of rubber gloves will again be appreciated in Teutonic countries. As a matter of fact, these so-called liquid gloves are not sufficiently durable to enable a surgeon to undertake long operations with them, and when left any length of time on the hands cause them to become numb and swollen.

RUBBER CASES BEFORE THE BRITISH PRIZE COURT.

An important rubber case lately came before Sir Samuel Evans, President of the British Prize Court. Messrs. Andresen & Muller laid claim to a quantity of rubber shipped on the Norwegian steamship "Bergensfjord," from New York to Bergen. The rubber had been seized as a prize on November 1, 1914, and the Crown claimed condemnation, contending that the goods, consisting of 347 cases of rubber, had been purchased from A. W. Brunn by A. Eber & Sohn, of Hamburg, Germany, through the account of Andresen & Muller as intermediaries. To support their claim, Andresen & Muller could produce a few cables, an invoice and one or two other documents. Counsel for the claimants declared that the documents proved that the purchase was made from their own monies and on their own account. It was, however, held that the documents were obscure and would have to be carefully collated before judgment could be rendered.

At a more recent sitting of the Prize Court, Sir Samuel Evans, the president, was requested by the Crown to condemn several packages of rubber seized on the three Danish steamers "Hellig Olav," "Oscar II" and "Frederick VIII." The rubber, done up in 11-pound packages to a total weight of six tons, had been sent from New York to Gothenberg, Sweden. Against this, Phillip Bauer & Co., Inc., New York City, protested on the ground that they were the owners. The Crown contended that the goods were destined for Germany and that, according to the evidence collected from intercepted cables and letters, the true claimants ought to be Phillip Bauer Co., of Hamburg, Germany.

The order of the Court was that the rubber be condemned as prize goods of absolute contraband nature destined for Hamburg.

An order for costs was made against the claimants, who were given leave to appeal.

TORPEDOED SHIPS NOW LOOTED OF RUBBER.

According to the crew of the torpedoed Norwegian steamship "Venglia," captured June 15 by a German submarine and used for 16 days unsuccessfully as a decoy for allied shipping, submarine crews whenever possible are looting captured ships of rubber and copper before sinking them. The U-boat commander stated that he had been away from his base for five months, supplies and torpedoes being brought by another U-boat whenever summoned by wireless. When his cargo hold was filled he would return home, he said.

The Editor's Book Table.

REPORTS OF THE PROGRESS OF APPLIED CHEMISTRY. ISSUED by The Society of Chemical Industry. Volume 1, 1916. London. Harrison & Sons. [8vo, 325 pages.]

THIS volume presents the progress of applied chemistry, from January, 1914, to June, 1916, reviewed in 15 sections, each by a recognized authority.

A section of 28 pages is devoted to India Rubber by H. P. Stevens, who gives a very comprehensive outline of progress under the following topics:

Statistics of Production; Production of Raw Rubber; Non-Caoutchouc Constituents of Rubber Latex; Effect of Details in Preparation; Properties of Rubber; Properties of Vulcanized Rubber; Physical Tests of Vulcanized Rubber; Quality and Uniformity of Rubber; Vulcanization; Accelerators; Synthetic Rubber; Analysis of Vulcanized Rubber.

The section concludes with over a hundred references to original sources and is a valuable compilation for the rubber chemist and student of rubber technology.

EIGHTEENTH YEAR BOOK AND ANNUAL REPORTS OF THE Rubber Association of America. Prepared by the Secretary. [8vo, 102 pages.]

This annual publication, prepared and printed for the members of the Association, contains a large amount of information of value to them, and also to all engaged in the rubber industry.

There is a full list of firm, associate and honorary members of the Association, the list of officers and standing committees. The several divisions are each represented in detail, with lists of officers, committees and membership. These divisions represent the manufacturers of mechanicals, soles and heels, sundries, hard rubber, also reclaimers, proofers, and those interested in foreign trade. The constitution and by-laws, the report of the seventeenth annual meeting, and the seventeenth annual banquet are given in detail. Included also are the rules and regulations governing transactions between buyers and sellers. There are excellent double page half-tones of the banquet and the outing of 1916.

While much of this has been previously published, its collection and arrangement in permanent form makes the book one valuable for reference in every rubber man's business office.

CHEMICAL PATENTS AND ALLIED PATENT PROBLEMS. BY Edward Thomas. John Byrne & Co., Washington, D. C. [8 vo, 58 pages, interleaved for notes. Bound in buckram. Price, \$2.50, delivered.]

This volume, for which a genuine need has existed, represents a complete rewriting of "Process Digest" by the same author, a member of the Appellate Federal Bars of New York and Washington, all the cases having been reread from the point of view of an attorney and expert witness, instead of that of a Patent Office examiner. Chemists and their attorneys will find it a clear and concise statement of the United States patent law. The major part of the work discusses broad underlying principles, while the remainder takes up points of practice and is accompanied by a virtually complete "finding list" of the cases on which the law of chemical patents is based, also including other important cases intimately related in reasoning. Upwards of 1,300 cases are cited under nearly 250 separate headings, with brief individual comments. All citations are given in footnotes, making the book interesting reading for the chemist and at the same time enabling the attorney to refer readily to pertinent cases. The references have been condensed by citing in general only the appeal case, or the last of a series, if that rules on all the points previously raised. Specific notes are given on the kind of evidence needed in chemical and allied cases, also notes covering cases on damages, licenses, etc.

THE FINANCIER RUBBER SHARE HANDBOOK. FOURTEENTH Edition, May, 1917. The Financier & Bullionist, Limited, London, England. [Cloth, 8vo, 877 pages. Price, 4 shillings, net.]

As in the past, this convenient handbook contains a wealth of details regarding the companies owning rubber plantations in Ceylon, South India, Borneo, Java, Burma, Sumatra, Africa, the Malay Peninsula and South America. It gives the authorized share capital of each of these companies, the amount issued, the balance sheet, the list of directors, acreage and similar information well arranged and quickly available. An alphabetical list of directors in all these companies is appended, including a list of secretarial groups with London addresses. In his preface, E. L. Killick, rubber expert of the "The Financier," explodes the bogey of over-production, showing that enormous expansion of the world's consumption has kept pace with increased production. He further points out that as there has been no extensive planting in the Middle East since the period 1910-12, and as the rate of increased production will rapidly decline beginning with 1917, a continued increasing demand at the past rate will find the world facing not a surplus, but an actual shortage of rubber.

BRAZIL TO-DAY AND TO-MORROW. BY L. E. ELLIOTT, F.R.G.S. The Macmillan Co., New York City. [8vo, 338 pages, illustrated, cloth. Price, \$2.25.]

Brazil continues to be a land of much moment to the rubber trade, which will welcome this handsome, absorbing and comprehensive work by one who knows the country well. Its history and colonization are interestingly narrated and the present and probable future status of its social conditions, transportation, industries, finance and commerce are clearly set forth. The chapter on the world's horticultural and medicinal debt to Brazil is little short of a revelation.

A section of 28 pages presents intelligently the history, development and details of the rubber industry of the Amazon as contrasted with the plantation industry of Malaysia. Methods of latex collection and coagulation, the system of labor and financing, and the various kinds and grades of Brazilian rubber are described. Measures necessary to put the industry on a sounder basis, particularly more careful, cleanly and uniform methods of coagulation, and more equitable and stable export taxes, are outlined. The controversy is also referred to as to the relative merits of plantations or further opening up of the untapped reserves of the interior, estimated at 300 million trees, many of them "black" *Hevea* yielding especially high quality latex. The author doubts if the present average rubber production of about 37,000 tons is likely to increase greatly for a time at least, because of the scarcity of labor, the high cost of living and the enormous expenditures necessary on roads, drainage and the like to open up virgin forests.

THE MANUFACTURE OF RUBBER GOODS. BY ADOLF HEIL and Dr. W. Esch, translated by Edward W. Lewis, A.C.G.I., F.C.S. Charles Griffin & Co., Limited, London, England. J. B. Lippincott Co., Philadelphia, Pennsylvania. [Large 8vo, 236 pages, illustrated, cloth. Price, \$4.]

Among the authoritative technological handbooks for the use of manufacturers, chemists and others engaged in the production of rubber goods this work has since 1909 occupied a prominent place. While the present reprint assumes a more elementary character at this advanced stage of the industry, it sets forth clearly and concisely those sound fundamentals which must still be the basis of successful manufacture, and will prove a useful addition to the library of every rubber man of the younger generation. Five chapters are devoted to the raw material, the vulcanization of rubber, the mixings, the manufacture of soft rubber articles, and the manufacture of ebonite. The

introduction details a plan and arrangement of a rubber goods factory, and two appendices are devoted to reclaiming rubber and specific gravity.

tapes and splicing gum and filling compounds. In all, the bulletins are informative and attractive.

NEW TRADE PUBLICATIONS.

THE Federal Rubber Co., Cudahy, Wisconsin, has published a little booklet entitled "Care Saves Wear," which treats of the care of tires. Photographs of damaged tires are shown and full explanations given of the causes of injury, with suggestions for prevention. Motorists can read this book with interest and profit.

* * *

Users of trucks—and what progressive manufacturing firms today are not?—will find interesting and informative reading in two well-illustrated booklets now being mailed on request by the Link-Belt Co., Chicago, Illinois. They are entitled "Link-Belt Roller Chains for Tractors and Trucks" and "Some Facts About Roller Chain Drives." The latter is written by a large user of chain drives, the Smith Motor Truck Corporation, Chicago, Illinois, and points out particularly the growing list of government decisions in favor of chain drive which has resulted from the severe tests of European warfare. Every argument appeals to reason.

* * *

With the determination of the United States Government to do its share in winning the war very largely through the air, the Army and Navy Air Services have come into far greater prominence than hitherto and seemed to demand a specialized publication devoted to their interests. The Gardner, Moffatt Co., New York City, was quick to meet this need with the "Air Service Journal," a new illustrated weekly which made its first appearance July 12 with the announced purpose to chronicle the news of the entire aircraft industry; to relate foreign events in the air; and to record progress and tell of personnel. Judging by the character of the first issue, with its special authoritative articles on military and naval aeronautics, the paper will prove of value to manufacturers, officers, enlisted men and all engaged in the aircraft industry or service. The subscription price is \$3 a year; foreign subscription, \$4.

* * *

"The Journal of the Society of Automotive Engineers," formerly the "S. A. E. Bulletin," made its appearance dated July, 1917, as a handsome 9 by 12 inch standard size technical paper of 96 pages, with 78 additional pages of advertising. Henceforth its attractive appearance, varied contents and authoritative character bespeak for it a prominent place among American engineering journals. The first issue is devoted chiefly to the papers and reports read at the semi-annual meeting of the S. A. E. held June 26 at the Bureau of Standards, Washington, D. C., and indicate the vast amount of constructive assistance being rendered the government in perfecting and standardizing automotive construction of every type for war purposes. Many illustrations, diagrams and portraits embellish the text. The publication is issued monthly from the offices of the society, 29 West Thirty-ninth street, New York City, subscription price, \$5 a year; to members, \$2.50 a year.

* * *

No one who has read H. S. Firestone's article, "Three Important Lessons My Business Has Taught Me," in "System" for July, will marvel at the success of the Firestone Tire & Rubber Co., with its assets of over \$33,000,000, surplus of \$18,000,000 and 1917 business estimated at \$60,000,000. Such principles of integrity, sound judgment and determination are bound to win. While pointing out fundamentals, Mr. Firestone claims to know of no absolute formula for success. "Simmered down," he writes, "business success depends chiefly upon the man and his adaptability and willingness in balancing his own factors of strength and weakness, and appraising and balancing the corresponding factors in others."

AMSTERDAM: OFFICE OF THE NETHERLANDS GOVERNMENT IN THE EAST INDIES.

In our issue of April, 1917, we reviewed a collection of important papers recording researches made in the above institute and published by the Trade Department of the Netherlands Ministry of Agriculture, Industry and Commerce, under the title, "Mededeelingen van den Ryksvoorlichtingsdienst ten behoeve van den rubberhandel en de rubbernijverheid te Delft." These papers were preceded by an introduction showing the relation between the various subjects treated. The International Association for Rubber Cultivation in the Netherlands Indies, recognizing that the fact that these valuable studies were written in Dutch would prevent their wider perusal, now offers an elaboration in English of this introduction. This first of the six parts in which the English version is to appear, is now ready for the public. It treats "The Examination of Latex and the Valuation of Raw Rubber According to the Exterior," seven sub-divisions being as follows:

- I. The state of colloidal aggregation of the rubber in the latex.
- II. Determination of the caoutchouc percentage of latex.
- III. The non-caoutchouc compounds of the latex.
- IV. The different methods of preparing rubber.
- V. External valuation of raw rubber.
- VI. Spots on raw rubber.
- VII. Transparent raw rubber.

While the introduction mentioned facts not elsewhere published, this elaboration contains points not found in the separate papers of the complete Dutch work. On the other hand, the subjects are, of course, hardly more than rather detailed summaries.

JAARBOEK VAN NEDERLANDSCH-INDIË, 1916. AFDEELING NAGELATENDE Handel van het Departement van Landbouw, Nijverheid en Handel. Rotterdam: J. van der Hoeft, 1917. 37 pages, 31 illustrations, tables.]

This finely illustrated yearbook of the Dutch East Indies was compiled by the Section for Industries and Commerce of the Department of Agriculture, by order of the Dutch East Indian Government, and presents a general review of the conditions in these colonies as they were in the year 1914. The opening chapter is devoted to a short description of the geological nature, climate, population, flora and fauna of the islands. Further brief and lucid chapters treat such subjects as Government and Judicature, Finance and Taxation, Agriculture, Commerce, Traffic and Communications. In connection with the rubber industry, the number of enterprises, their distribution, the acreages devoted to the different kinds of rubber, as well as the quantities and values exported during several years, find mention. Most of the subjects are prefixed by a short historical summary.

Although occasionally more detailed treatment would have been desirable, the volume is both interesting and valuable, and since it is published in English, should find a large circle of readers.

WIRES AND CABLES. BULLETIN 493-233. GENERAL ELECTRIC Co., Schenectady, New York. [4to, 84 pages.]

These bulletins, of a series distributed by the above-named company, while in the nature of a catalog, contain a great amount of information as to the progress and method of underground and submarine transmission of electricity. Description of the various forms of cables, terminology decided upon by the Bureau of Standards, tables giving resistance, inductance, reactance, impedance, maximum voltages of cables, cords and flexibles are given, and added to this are descriptions of coupling boxes, cable bells, junction boxes, manhole boxes,

Interesting Letters from Our Readers.

MALAYAN PLANTERS FEAR AMERICAN COMPETITION.

TO THE EDITOR OF THE INDIA RUBBER WORLD:

DEAR SIR—The restrictions upon the export of rubber from the Malay Peninsula chiefly through the rigid control of the Tin & Rubber Committee of London, still is a subject of much interest and concern to American buyers and importers as well as to the Malayan planter and shareholder. It would appear that the latter, however, are impressed that their territory and the plantations they control are necessary to the world's supply of rubber and, therefore, are to an essential degree monopolistic.

The results of this erroneous view are being suspicioned and will soon, no doubt, be realized by these planters and shareholders as they see their present profitable (45 cents a pound net) American customer forced to abandon them.

The planters and shareholders of Malaya have great fears of Americans forcing down the prices—the abnormal prices—they have enjoyed from the world and especially from America, of fully 45 cents a pound net profit. I quote from a recent interview of the well known firm of Baker, Morgan & Co., Limited, in the "Straits Times," of Singapore:

Our greatest fear would seem to be American buyers forcing down the price out here (Malaya) greater than the fear of overproduction. With regard to this we fancy the government may be relied upon to step in . . . and fix a minimum price per pound . . .

This expressed opinion is but one that is prevalent there showing the local erroneous view that Malaya has the only rubber favored portion of the earth, and because of the monopoly their government can by law—by a printed statute—fix the minimum price which the outside world will have to pay, if they want the product. The ancient established principle of "supply and demand" as governing prices appears to have been entirely lost sight of as an equilibrium and safety valve. It is this erroneous, if not fallacious conception of things as they exist that the planters and shareholders are deceiving themselves thereby.

The restrictions by law recently enacted in amendments to the "Land Rules, 1904, Section 13," governing the alienation of lands in the F. M. S. Malay Peninsula, limit the title to not more than 50 acres to any except to British subjects. This has successfully barred out any planting by Americans. I quote from an editorial in the "Malayan Rubber Journal," entitled, "The American Invasion":

. . . and we are inclined to think that the F. M. S. Government's present policy of refusing to give any one except a British subject more than 50 acres of state land is intended primarily to delay an "American Invasion" until such time as a decisive policy is agreed upon.

The planters there are apparently disturbed by a bogey and are imagining ghosts and hobgoblins along the line as to the so-called "American Invasion," as is evidenced further from editorials from the same journal, which express in part the prevailing sentiment there:

. . . we dislike their (Americans) way of seeking to turn everything into a monopoly or trust, and for this latter reason have opposed their entry into Malay as rubber planters, . . .

The Standing Committee of the Planters Association of Malay at its recent meeting reported under the head of "Rubber's Chief Menace" amongst other things, as to the alienation of land:

The matter was discussed . . . and resulted in a request to the Federal Government to stop the alienation of land to aliens at a time when neither British capital nor British superintendence was available for opening up land.

The same report also states that the Rubber Growers' Association of London simultaneously approached the Secretary of

State for the colonies and as a consequence the High Commissioner has notified that no land exceeding 50 acres in the Federated Malay States will be alienated to any one except a British subject.

The Creator of the earth did not make Malaya and Ceylon the only spots on the globe suitable for the growth and production of *Hevea* rubber. The soil and climate of some of the islands of our own Philippines are equally as suitable by nature. I instance Basilan island of the department of Mindanao and Sulu. Also Sumatra, the third largest island on the globe, whose rubber producing domains have scarcely been explored or penetrated. Java is producing by leaps and bounds. W. H. Rickinson, the world-renowned rubber statistician and authority, states the exports from Java the first three months of 1916, were 2,531 tons; for the same period of 1917 they were 5,042 tons—approximately double or, to be exact, an increase of 99 1-10 per cent.

The Secretary of the Rubber Growers' Association of the Netherlands East Indies told me while I was in Batavia the fore part of the year, that the ratio of natural increase in the Dutch Indies based upon acreage planted and tree-age, would yield 120,000 tons or thereabouts in the year 1919. That is about the estimated requirement for America this year.

JESSE E. LA DOW.

Secretary of the Mansfield Tire & Rubber Co.

Mansfield, Ohio, August 8, 1917.

EXTRA DURABILITY IN TIRE TREADS.

TO THE EDITOR OF THE INDIA RUBBER WORLD:

DEAR SIR—Believing some results obtained with a special composition of rubber, invented by me, are sufficiently novel and show points of advantage over regular mixings such that the material is worthy of note in THE INDIA RUBBER WORLD, I am mailing you data in reference to the material as used in treads of pneumatic tires.

First comparative results showed the specific gravity of factory regular white tread stock 1.80—of Textile, white tread stock 1.12. Comparison of weights of complete tires in size 32 by 3½—factory tire with regular stock throughout 14 pounds, 10 ounces, same but with Textile composition in tread only, 12 pounds, 6 ounces. Placed on rims and both inflated with same pressure, Textile tread measured ⅝ inch less in circumference from edge of rim to edge of rim than the regular tire.

This inflated measurement test brings out some points in tire construction that cannot be ignored. In the regular tire, it shows the carcass is stretched (weakened), the tread is also stretched and as stretched rubber is much easier to surface cut and puncture, the tire is weakened in every particular by the stretch. In comparison, the Textile tread, by resistance to stretch, not only retains, but adds to, the full strength of the carcass. Also this tread is not stretched and so retains all of the superior wear and resistance to cuts and punctures that are marked characteristics of Textile rubber.

To show the resiliency of Textile rubber a test that was made with a view to its use in solid truck tires is given. A section 4 by 3 by 1½ inches was placed under hydraulic pressure; the 3-inch measurement was compressed to ¼ inch by an amount of pressure registering 90 tons. When released, the section returned to all original measurements without a break.

The tires in actual service on cars are showing that the nap of the incorporated textile at the surface affords superior traction and resistance to slipping on wet pavements. The wearing service is proving more than equal to expectations, but as they

have been run only a few thousand miles at this writing, a total mileage report cannot be given now.

The extreme lightness in gravity of Textile rubber suggests its value in making pneumatic tires for airplanes.

JOSEPH R. SANFORD.

Salisbury, Connecticut, August 18, 1917.

THE OBITUARY RECORD.

ORGANIZER, BUILDER AND CONTRACTOR.

HARRY L. LEWMAN, president of the Ten Broeck Tyre Co., Louisville, Kentucky, died in that city in July after a prolonged illness, aged 51 years and one day. Mr. Lewman was born in Gosport, Indiana, July 15, 1866, though a large part of his business life was spent in Louisville. For many years he was in the general contracting business in association with his father, M. T. Lewman. The firm was noted for handling large contracts, prominent among which was the erection of the government dam in Warrior River, Alabama. This company made a specialty of courthouses and is said to have built more courthouses in the South than any other concern in the country.

In 1913 Mr. Lewman founded and organized the Ten Broeck Tyre Co., becoming its president and having personal supervision of the erection of the plant and the building up of the business, which he had the pleasure of seeing develop to such an extent that it was deemed necessary to greatly enlarge the original plant, and to add a textile mill for the purpose of weaving its own tire fabric, and this undertaking was nearly completed at the time of his death.

Mr. Lewman was twice elected president of the National Association of Master Builders. He was a member of Masonic orders. He was also a large property owner in Louisville and possessed holdings in several local enterprises. He is survived by a widow, a daughter and three brothers.

A PIONEER TIRE EXPERT.

W. Scott Alkire, prominent in the tire department of The B. F. Goodrich Co., Akron, Ohio, died at his home in that city recently, aged 54 years.

Mr. Alkire was one of the few men who grew up with the company. He entered its employ 26 years ago, and has seen it grow from small beginnings to its present prodigious proportions, and in its progress he was a factor. When the pneumatic bicycle tire business became important, he entered the tire department, and with the rise and growth of the automobile tire industry, he steadily progressed, becoming assistant superintendent of that department, relinquishing that office to become a prominent member in the experimental department, where his practical knowledge proved of great value to the company.

BORE A WELL KNOWN NAME.

Hon. Morton E. Converse, founder of Toy Town (Winchendon, Massachusetts,) died August 25, at the age of eighty. He was of the Converse family, notable as the founders of the Boston Rubber Shoe Co. He was a Civil War veteran, a member of the Massachusetts House of Representatives and Senate and a member of many clubs and orders, and was noted for his public spirit and broad philanthropy.

SON OF A PROMINENT RUBBER MANUFACTURER.

H. Norman Grieb, son of William G. Grieb, president of the Ajax Rubber Co., Inc., New York City, died in Paris, France, August 26, of pneumonia, following injuries received while flying. He went abroad in May, with the Yale medical unit, but on his arrival in France joined the French aviation

service. He had received his pilot's license and had been detailed to active duty at the front at the time of the accident. He was 22 years old. A brother, Harold, 20 years old, is also in France.

BRITAIN PERMITS IMPORTS OF RUBBER GOODS.

Since May 10, 1917, the importation of rubber manufactures into the United Kingdom has been prohibited. According to a recent cable from London it is understood that Great Britain is now prepared to license rubber imports to the extent of 15 per cent of the amounts imported in 1916. Application should be made to the Department of Import Restrictions, London.

United Kingdom imports for the calendar year 1916 were as follows: Waterproofed apparel, £9,518; boots and shoes, 250,746 dozen pairs, £438,196; insulated wire, £133,728; submarine cables, £7; automobile tires and tubes, £2,207,210; motorcycle tires and tubes, £93,173; cycle tires and tubes, £113,442; tires not specified, £10,040.

TENNIS SHOE PRICES.

The tennis shoe season ends early in September, and it has been the custom of the manufacturers of these goods to announce prices for the next season on September 1. This year, however, the United States Rubber Co. sent out new price-lists on August 1, and the other manufacturers were but a few days behind with their announcements.

With the enormous advance in costs of materials and labor, it was natural to expect a heavy advance over previous prices, and under the circumstances it was somewhat of a surprise that the advance was so moderate. In some of the finer lines, those wholesaling between \$1 and \$2.50 a pair, 10 to 25 cents was added, but on those selling at less than \$1 last September, 10 to 15 cents was the maximum advance.

It may be remembered that last year another list was sent out late in October which showed material advances over September, 1916, prices. The present price-list in some cases shows no advance over the October one, while in few cases are the prices more than 15 cents higher, and most of these cases are in lines which were not advanced in the October list.

Whether these August, 1917, prices, which are "subject to change without notice" will be supplanted by later announcements this fall, is impossible to foretell. Costs of materials are constantly increasing. Taxes are heavier. There are possibilities of further labor demands. If the manufacturers readjust prices later, as they did last October, there is no doubt that many, or all lines of tennis shoes will be marked up from August 1 prices.

ASBESTOS MINE DISCOVERED.

An asbestos mine has been discovered at Horsehide Springs, Rattlesnake Mountain, Wyoming, which promises commercial value, even though the mineral will have to be conveyed 150 miles, probably by motor trucks, to the nearest railroad. The find is reported by C. B. Stewart, secretary of the Utah Wool Growers' Association, whose automobile broke down at the location, thus leading to the discovery.

NEW LINE TO CALLAO.

W. R. Grace & Co., New York City, will establish a line of fast steamers between that city and Callao, Peru, by means of the Panama Canal, making the trip in 11 days. At present the best service between New York and Callao requires about 20 days, making allowance for a delay of from 4 to 6 days on the Canal Zone. The firm has a well organized branch in every port along the Pacific coast of South America, and will be able to supervise closely the work of discharging its own vessels.

News of the American Rubber Trade.

McGraw Annual Sales Conference.

THE McGraw Tire & Rubber Co. held its annual sales conference on August 2 and 3, all branch and district managers gathering at the home office, East Palestine, Ohio. Sales policies were carefully discussed and it was decided to continue the successful method of selling exclusively through jobbing channels. Increased warehouse facilities are being arranged for at important distributing centers to care for the growing demand for McGraw, Pullman, Imperial and Congress tires and tubes.

The executive changes in the company's personnel are as follows: R. E. Hayslett, formerly connected with the Timken Roller Bearing Co., has been made assistant to John Morgan, vice-president and treasurer. R. G. Nelson, formerly assistant sales manager, is appointed director of sales, assuming direct control over all general office and branch sales. F. C. Strayer has become Atlanta district manager.

RUBBER COMPANY DIVIDENDS.

The Hood Rubber Co. paid a quarterly dividend of $1\frac{3}{4}$ per cent on August 1 to stockholders of record July 26; also a 1 per cent dividend on August 15.

The Amazon Rubber Co. has declared a dividend of $3\frac{1}{2}$ per cent on preferred stock, payable September 1 to stockholders of record August 20.

The Ajax Rubber Co., Inc., has declared a regular quarterly dividend of \$1.50 per share, payable September 15 to stockholders of record August 31.

The B. F. Goodrich Co. has declared a dividend of $1\frac{3}{4}$ per cent on preferred stock, payable October 1 to stockholders of record September 21; also 1 per cent on common stock, payable November 15 to stockholders of record November 5.

The board of directors of the Pennsylvania Rubber Co. has declared a regular quarterly dividend of $1\frac{3}{4}$ per cent on preferred and $1\frac{1}{2}$ per cent on common stock, payable September 29 to stockholders of record September 15.

RUBBER COMPANY SHARE QUOTATIONS.

The following market quotations of shares of rubber manufacturing companies on August 25 are furnished by John Burnham & Co., 115 Broadway, New York City, and 41 South La Salle street, Chicago, Illinois.

	Bid.	Asked.
Ajax Rubber Co. (new).....	65	69
Ernestine Tire & Rubber Co., common.....	115	118
Ernestine Tire & Rubber Co., preferred.....	102	105
The B. F. Goodrich Co., common.....	48	49
The B. F. Goodrich Co., preferred.....	104	105
Goodyear Tire & Rubber Co., common.....	185	190
Goodyear Tire & Rubber Co., preferred.....	105	107
Kelly Springfield Tire Co., common.....	44	48
Kelly-Springfield Tire Co., preferred.....	87	95
Miller Rubber Co., common.....	165	175
Miller Rubber Co., preferred.....	102	104
Portage Rubber Co.....	145	150
Swinehart Tire & Rubber Co.....	—	60
United States Rubber Co., common.....	61	62½
United States Rubber Co., preferred.....	105	109

PETLEY RUBBER COMPANY ABOUT TO OPERATE.

The Petley Rubber Manufacturing Co., notice of whose incorporation appears elsewhere in this issue, has purchased outright the entire machinery and equipment, together with all material, dies, molds, etc., of the Oldtown Rubber Co., of Xenia, Ohio, and these are being moved to Milwaukee, Wisconsin, where the Petley company will occupy the premises at 241-247

Oregon street. New machinery is being added to that purchased from the Oldtown company and operation at the Milwaukee plant will commence early in September.

L. M. Bickett, former superintendent of the Oldtown Rubber Co., together with D. A. Bickett, of the same company, have joined the Petley forces at Milwaukee.

THE MASON TIRE & RUBBER APPOINTMENTS.

John H. Diehl has been appointed general sales manager of The Mason Tire & Rubber Co., Kent, Ohio. Starting with The B. F. Goodrich Co. in 1894, he later served successively as manager of the Philadelphia and the Buffalo branches of that company. He joined the Portage Rubber Co., Akron, Ohio, at the time of its organization in 1912, as salesmanager, and has been with that organization in the position of manager of sales for the last five years.



JOHN H. DIEHL.

George C. VanVeen has been appointed manager of the new direct factory branch of the Mason Tire & Rubber Co., which has recently been opened at 2120 Michigan boulevard, Chicago, Illinois. He will also have charge of sales of Mason tires for the entire central district of the United States. He has been manager of the Kansas City branch since it was opened and his work there was so successful that he has been given the promotion to Chicago.

Mr. VanVeen started his business career in the automobile industry in New York City, but soon entered the tire field with the Ajax-Grieb Rubber Co., New York City, being located in the Middle West. He left this concern to enter the retail tire business in Detroit, Michigan, later selling out to become associated with the Mason company, whose business has shown splendid growth in the territory of which Mr. VanVeen has had charge, and the steadily increasing business is largely due to his energy and knowledge of the business.



G. C. VANVEEN.

H. C. Smith has recently been appointed manager of the Kansas City branch of the Mason Tire & Rubber Co., succeeding Mr. VanVeen. Mr. Smith has been a salesman with the Kansas City branch since it was established, and his advancement to the position of branch manager is due to his very successful record. He has had many years of successful experience in the rubber business. For five years he was with The B. F. Goodrich Co., Akron, Ohio, and knows the trade in the West and Southwest thoroughly, particularly in the states of Missouri, Kansas, Nebraska, Oklahoma, Texas, New Mexico, Colorado and Wyoming, and this acquaintance, together with his experience in the Kansas City branch, makes the appointment specially appropriate.



H. C. SMITH.

MAJOR OSTERRIETH AND HIS CANINE PAL.

WHEREVER the Belgian Commission has been entertained with acclaim in America, the commanding figure of Major Leon Osterrieth, former rubber merchant of Antwerp, has arrested the attention of every onlooker. Of towering stature, huge physique, distinguished bearing, and in facial characteristics somewhat resembling the late King Edward VII of



TWO BELGIAN VISITORS TO AMERICA.

England, he stood head and shoulders above all the other members of the Commission and was the first to be seen in a crowd. Few except those near him, however, noticed the wire-haired fox terrier that was seldom absent from his side, yet Major Osterrieth declined to accompany the mission to America when refused per-

mission to take "Nellie" with him. The Belgian Government gave in, however, the dog is on the trip and so comes to light a touching little human interest story of canine devotion and a master's appreciation.

"Nellie" first went to Belgium with an English army officer during the early days of the war. The Englishman was killed, and for weeks "Nellie" wandered aimlessly among the Belgian and English. Time after time officers and soldiers sought to make her a pet but in vain. "Nellie" was what dog fanciers call a "one man dog" until she ambled by the major's tent one day and heard his deep voice proffer a kindly invitation to share his meal. For the first time since the death of her old master "Nellie" displayed friendliness and accepted the bone he offered her. Then she disappeared.

During the German attack that night the major forgot "Nellie." Not until the early hours of the morning was the attack repulsed. Then as the major was settling down to sleep in his make-shift cot he heard a piteous whine outside the tent. He got up and looked out.

There was "Nellie." A German bullet had almost torn her right shoulder off. The big scar can be seen there today. Tenderly did the major take the dog in. He bound up the wound and gave "Nellie" a place in his quarters. Since then the dog has never left him, and his affection for his canine pal in some of the bitterest battles in the war can only be measured by his willingness to sacrifice a great honor to prevent their separation.

DOMINION RUBBER SYSTEM PROMOTIONS.

H. R. Willans, druggists' sundries department, Montreal branch, has been transferred to the Ottawa branch as salesman for druggists' sundries and waterproof clothing.

Alfred E. Cox succeeds Mr. Willans at Montreal.

L. A. Blanchard has joined the staff of the Montreal branch and will develop trade for Rinex soles and heels among shoe manufacturers.

PERSONAL MENTION.

Among the names on the Birthday Honors List of the King of England was that of Sir Frederick Smith, Bart., J. P., who has been created a Baron of the United Kingdom. Sir Frederick is chairman of Chas. Macintosh & Co., Limited, which firm he joined about 25 years ago. He is also chairman of the New Liverpool Rubber Co., Limited, the North Borneo Rubber Co., Limited, and is on the boards of the Lancashire and Yorkshire Bank and of the Garswood Hall Colliery Co. In the year 1912 he was created a baronet.

Thomas A. Aspell, who has been manager of the truck tire department at the New York City branch of The B. F. Goodrich Co., Akron, Ohio, has been placed in charge of the specification work this company is doing for the United States Government. While this duty will require his frequent presence in Washington, D. C., he proposes to make his headquarters in Akron.

J. E. Powers, who for the last eight years has been in charge of the truck tire department of the Buffalo (New York) branch of the B. F. Goodrich Co., Akron, Ohio, has been appointed to a similar position at the New York City branch of the same company.

Victor Van Der Linde, recently returned from a tour through Norway, Sweden, Finland and Russia doing special technical work for The B. F. Goodrich Co., Akron, Ohio, has great confidence that the Russian democracy will do its full share in the struggle against German autocracy. Mr. Van Der Linde was in Petrograd when the revolution took place, and had an exceptional opportunity to observe its immediate causes and effects. The American commission, headed by Elihu Root, he says, put new confidence into the Russian people. The army is now eagerly resuming the offensive and if an adequate supply of munitions, food and clothing be maintained by the workingmen, will fight as never before. Europe generally, he says, is much impressed by the entry of the United States into the war, yet it is his personal opinion that the war cannot end under two years' time.

Albert F. Hill has severed his connections with the Rubber & Guayule Agency, Inc., and on and after October 1 will be connected with the firm of Wallace L. Gough & Co., 15 William street, New York City.

Fred Haupt, formerly vice-president of the Ten Broeck Tyre Co., Louisville, Kentucky, has succeeded to the presidency, filling the vacancy created by the death of H. L. Lewman.

Arthur H. Clark, formerly of the Lycoming Rubber Co., Williamsport, Pennsylvania, has been made assistant superintendent of the St. Louis, Missouri, plant of the Goodyear's Metallic Rubber Shoe Co.

C. W. Hardin has been appointed manager of mechanical sales of the Republic Rubber Co., Youngstown, Ohio.

R. L. Devoe, for several years branch manager at Chicago, Illinois, of the Dayton Rubber Manufacturing Co., and more recently assistant sales manager at the home plant at Dayton, Ohio, has been made sales manager. It is claimed that the 1918 expansion plans will place this company among the more prominent rubber manufacturing plants of the country.

A. Boyd Cornell, secretary of the Empire Rubber & Tire Co., Trenton, New Jersey, has tendered his resignation. He started in the rubber business immediately after graduating from Princeton in 1901, and worked in every department, thereby gaining practical knowledge of the business. Several propositions are being considered, but his future plans are not yet decided upon.

Harry R. Nason has been chosen secretary of the Empire Rubber & Tire Co., Trenton, New Jersey, succeeding A. Boyd Cornell, resigned.

John F. Bresnahan has been appointed general sales and advertising manager of the American Chiclé Co., New York City.

NEW OFFICERS FOR WESTINGHOUSE.

The board of directors of the Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pennsylvania, recently elected officers for the ensuing year as follows:

Guy E. Tripp, chairman of board; E. M. Herr, president; L. A. Osborne, Charles A. Terry, H. P. Davis, H. D. Shute, H. T. Herr, Walter Cary, vice-presidents; T. P. Gaylord, acting vice-president; James C. Bennett, comptroller and secretary; Warren H. Jones, assistant secretary; H. F. Baetz, treasurer and assistant secretary; S. H. Anderson, assistant treasurer and assistant secretary; L. W. Lyons, assistant treasurer; F. E. Craig, auditor; W. B. Covil, Jr., and Wm. J. Patterson, assistant auditors.

In addition to its regular dividends, on July 31 the Westinghouse company paid a special Red Cross dividend of 25 cents per share on all capital stock outstanding, both preferred and common.

STUNGO-RADIUM RUBBER CO. WILL OPERATE SOON.

As a result of action taken by a dissatisfied stockholder the affairs of the Stungo-Radium Rubber Co., Washington, Pennsylvania, were placed in the hands of a temporary receiver on July 20. After a four days' hearing, beginning July 24, before Judge Irwin, of Washington County, however, the receivership was dismissed, it having been shown that the affairs of the company are in excellent condition, but that the inability of one stockholder absolutely to dominate the policy of the company had been the cause of some internal dissension which had been nearly eliminated.

The company has available assets in plant, cash and accounts receivable exceeding \$500,000, and liabilities of less than \$75,000, of which \$50,000 is a mortgage on which no payments are required until 1920. A large portion of the machinery is already in the plant, the first unit of which will be in operation about November 1, with a capacity of 500 tires daily. Equipment for a second unit of the same size is already being manufactured, as the company now has sufficient orders for operation at full capacity for more than a year.

The officers of the company are: Floyd Rose, president; R. P. McDonald, secretary and treasurer; Floyd Rose, Bert S. Shafer, John W. Rinehart, R. P. McDonald and Joseph Stungo, directors. The first three directors named comprise the executive committee now in control of the company's affairs.

MADERO SUED FOR PATENT INFRINGEMENT.

A suit has been filed in the Federal Court, San Antonio, Texas, against Salvador Madero and others, by Ferdinand Ephraim, of San Francisco, California, for damages due because of infringement of Mexican Patent No. 4,079, granted Ephraim October 29, 1904, for a process of extracting gum or rubber from any rubber-bearing plant or shrub. This suit was filed in Texas because the courts of Mexico are closed, and Madero is a resident of San Antonio. The plaintiff claims that for a number of years past Compania Explotadora Coahuilenese, Compania de Hule Australia and Compania de Las Delicias have been and now are corporations foreign to the United States of America, namely, corporations organized and existing under and by virtue of the laws of Mexico; that Salvador Madero, Francisco Del Hoyo and Antonio Villalbo, Sr., are associated as copartners under the name of Salvador Madero & Co., and that Salvador Madero is the general manager or agent of these corporations. The claim is made that these firms have, without consent of the patentee, used this patent in the production of upwards of 30,000,000 pounds of rubber from the guayule shrub, and have received from the sales of this rubber, principally in the United States, a sum exceeding \$8,000,000. Plaintiff asks judgment for that amount, besides costs of suit, counsel fees, etc.

The result of this suit will be awaited with interest by the rubber trade of this country and Europe.

PENNSYLVANIA RUBBER CO. INSURES EMPLOYEES.

The Pennsylvania Rubber Co., Jeannette, Pennsylvania, has arranged for the life insurance of its men and women employes, on a graduated scale, depending on the length of employment. The payments of the premiums are made by the company. Those who have been employed one full year or less, are insured for \$300; two full years or over, \$500; and for each full year over two, an increase of \$100 annually until the maximum of \$1,000 is reached, these sums payable to the beneficiaries, at the death of the employes thus insured.

NEW TIRE VALVE PATENT.

On May 15, 1917, patent No. 1,226,608, for Tire Valve, was issued to the Scoville Manufacturing Co., assignor of John Lines, of Waterbury, Connecticut. The application for this patent was filed in the Patent Office on October 18, 1897, but through an unusual situation in the Patent Office was not issued until May 15 of the present year. The owners of the patent, the Scoville Manufacturing Co., and A. Schrader's Son, Inc., who are licensees under the patent, were apparently under the belief that the patent had been actually issued, until upon investigation it was found that the issue had not taken place. This unusual situation apparently occurred through no fault of the Scoville company or its licensee, and upon the facts being presented to the Patent Office the patent was duly and legally issued.

THE EAGLE RUBBER CO. EXPANDS.

The new factory building of the Eagle Rubber Co., Ashland, Ohio, shown herewith in a bird's-eye view, is constructed mainly of brick and steel, with a floor space of approximately 25,000 square feet and track frontage of 146 feet. It will be ready for occupancy October 1. Toy balloons are the principal product



of the Eagle company and this addition to its plant will allow for an output of 200,000 of these balloons per day, permitting as well the manufacture of various other items contemplated for the near future.

STANDARD MALKONITE.

Standard Malkonite is a new product that is recommended by the Standard Malkonite Co., Arrott Building, Pittsburgh, Pennsylvania, for a variety of purposes. It may be used in the manufacture of puncture-proof tires for automobiles, motor-cycles and bicycles. It is said to be adaptable as an insulator for electric wires, conduit tubing, switch-boards, signal insulations, and battery jars. Also it is claimed to be an available material for typewriter platens, ten pin balls, acid proof jars, soles and heels.

NEW INCORPORATIONS.

Avalon Rubber Manufacturing Co., The, July 13 (Ohio), \$50,000. J. F. Hower (president and general manager); L. B. Turner (secretary); W. W. Spears (treasurer). Principal office is in Akron, and the factory will be located at Barberton—both in Ohio. To manufacture molded rubber goods, including the more popular articles in the molded mechanical line.

Bay State Insulated Wire and Cable Co., The, July 21 (Boston), \$300,000. J. H. H. McNamee, M. M. L. McNamee—both of 600 Blue Hill avenue; H. E. McNamee, 1509 Blue Hill avenue, M. J. Cashman, 1 Arborway Court—all in Boston, Massachusetts; J. S. Cashman, 643 Canal street, Manchester, New Hampshire. To manufacture and deal in wire and cable products, and articles made in whole or in part of rubber, leather, etc.; also to manufacture and deal in machinery or electrical or hardware supplies.

Century-Plainfield Tire Co., August 17 (New Jersey), \$100,000. C. P. L. Huston, J. D. Grant and W. F. Hart—all of 902 North avenue, Plainfield, New Jersey, which is the address of the principal office of the company. To manufacture, buy, sell, repair, convert, alter, let or hire and deal in tires and inner tubes for tires of every class and description, for use on motor vehicles and other vehicles of every kind, mechanical rubber goods, rubber packings, rubber appliances, and any and all articles of every name, nature and description wherein or in connection with which rubber or rubber compounds or any by-products of rubber are or may be used, etc.

Community Rubber Co., July 26 (Indiana), \$3,150. H. A. Geller (secretary), 167 So. Broad street; E. L. Royall (director), 22 Brynmawr avenue; R. J. Stokes, 833 W. State street—all in Trenton, New Jersey.

Consumers Tire & Tube Co., The, August 3 (Wisconsin), \$10,000. W. S. Mason, G. L. Blum and G. F. Blum. Principal office located at Eau Claire, Wisconsin. To buy and sell automobile tires and accessories.

Continental Tire & Rubber Co., The, August 20 (Delaware), \$300,000. C. L. Rimlinger, F. A. Armstrong—both of Wilmington, Delaware, and C. M. Egner, Elkton, Maryland. Principal office within the State of Delaware is with the Corporation Trust Co. of America, 486 du Pont Building, Wilmington, Delaware. To manufacture, produce, buy, sell, import and generally deal in rubber and gutta percha.

Dunbar-Daggett Co., The, July 31 (Massachusetts), \$10,000. J. F. Dunbar (president); H. A. Daggett (treasurer)—both of 89 Mt. Vernon street, Boston, Massachusetts; and W. A. Thibodeau, Stoneham, Massachusetts. To manufacture and deal in crude rubber or any of its allied products.

Ideal Wheel & Tire Co., August 4 (New Jersey), \$50,000. M. Munzer, 430 E. 141st street, New York City; H. Small, 547 S. 12th street; J. H. Dwork, 217 W. Kinney street—both in Newark, New Jersey, which is the address of the principal office of the company. To manufacture automobile wheels and tires.

International Fibre Co., The, August 14 (New Jersey), \$200,000. Peter E. Wurfflein, William Keegan, LeRoy W. Skelton—all of Trenton, New Jersey. To make, purchase, and sell rubber and rubber fibre soles, heels, mats and all goods of which rubber or fibre are component parts, etc.

Legeim Rubber Co., July 25 (New Jersey), \$25,000. A. McMahon, C. B. Hermans, and F. Losche—all of 1 Montgomery street, Jersey City, New Jersey. Principal office located at 519 Bergen avenue, Jersey City, New Jersey. To manufacture, purchase and sell rubber goods of any and every kind, including automobile tires, tubes and shoes, and all goods of which rubber is a component part.

Lockwood Compound Co., August 4 (Massachusetts), \$20,000. A. Millen, 44 Elm avenue, Wollaston; R. Litchfield, 12 Worcester square, Boston; J. A. Hay, 381 Talbot avenue, Dorchester—all

in Massachusetts. Principal office, Boston, Massachusetts. To manufacture and deal in all products and by-products of rubber and rubber compounds.

Mogul Tyres, Inc., of New England, August 7 (Delaware), \$250,000. C. A. Cole, Hackensack, New Jersey; A. R. Oakley, Pearl River, and Wm. E. Schiells, Jr., 153 Division avenue, Brooklyn—both in New York. The office of the corporation within the State of Delaware is with the Registrar and Transfer Co., 900 Market street, Wilmington, Delaware. To manufacture and deal in automobile tires, goods, wares and merchandise.

Multi-Life Tube & Rubber Co., Inc., August 13 (New York), \$90,000. C. W. Blanford, 452 Fifty-sixth street; C. D. Quick, 25 Clinton street, and I. D. Hamilton, 452 Fifty-sixth street—all of Brooklyn, New York. To manufacture rubber tubes and tires.

Muskogee Tire Repair Co., July 18 (Oklahoma), \$1,400. R. Y. Edwards, G. F. McIntyre and C. M. Cagle—all of Muskogee, Oklahoma, where the principal office is located. To buy, sell, and deal in all classes of automobile tires and to repair the same.

Pan-American Rubber Co., The, July 2 (Wisconsin), \$200,000. Joseph Huebner, Sr., (president and general manager); Joseph Huebner, Jr., and Louis E. Fichaux—all of Milwaukee, Wisconsin. Principal office, 409-411 Third street, Milwaukee, Wisconsin. To deal in rubber and all goods and products of which rubber shall be a component part and to operate processes for the manufacture of rubber, etc.

Petley Rubber Manufacturing Co., July 20 (Wisconsin), \$100,000. J. R. Petley (president and treasurer); F. J. Edwards (vice-president); L. S. Pease (secretary); L. M. Nahin. Principal office, Milwaukee, Wisconsin. To manufacture a complete line of molded mechanical rubber goods, rubber heels, etc.

Robertson Rubber Co., Inc., August 13 (New York), \$5,000. J. A. Lynch, West New Brighton; John Aigeldinger, West New York, and John Robertson, Union Hill—both in New Jersey. To manufacture rubber goods of all kinds.

Rotary Tire Service Co., June 24 (Michigan), \$15,000. E. W. Stuber, 24 Garfield avenue; N. G. Currie, 38 Hanover street; H. G. Baker, 119 Willis avenue, West; W. N. Warren, Holmcroft, Grosse Isle—all in Detroit, Michigan. Principal office, 759 Cass avenue, Detroit, Michigan. Buying, selling and repairing automobiles, acquiring and maintaining a gasoline and lubricating oil supply station.

Shenango Tire Co., Inc., August 10 (Delaware), \$300,000. W. A. McCoy, Pittsburgh, Pennsylvania; W. I. N. Lofland, Charles H. Jones—both of Dover, Delaware. Principal office within the State of Delaware is with the Capital Trust Co. of Delaware, Dover, Delaware. To make and deal in auto tires.

Sterns Tire & Tube Co., July 6 (Iowa), \$100,000. A. A. Schneiderhohn (president and secretary); P. Simones (vice-president); G. J. Timmerman (treasurer). Principal office, Dubuque, Iowa. Manufacturing, jobbing and wholesaling auto tires and vehicles.

Sternwear Tire Sales Co. of Minnesota, August 6 (Delaware), \$150,000. G. L. Rimlinger, M. M. Clancy—both of Wilmington, Delaware; C. M. Egner, Elkton, Maryland. The office of the corporation within the State of Delaware is with the Corporation Trust Co. of America, Dupont Building, Wilmington, Delaware. To manufacture and deal in automobile tires, tubes, and particularly the "Sternwear Inner Tube."

Sternwear Tire and Tube Co. of Oklahoma, July 9 (Oklahoma), \$60,000. C. F. Andersen, F. H. Grant and W. MacRae—all of Oklahoma City, Oklahoma. Principal office, 602 N. Hudson street, Oklahoma City, Oklahoma. Manufacturing, wholesaling and retailing automobile tires and tubes and automobile accessories.

Watkins Tubeless Air Cooled Auto Tire Co., August 13 (Delaware), \$1,000,000. T. C. Watkins, Ingram; W. Burnside, Pitts-

burgh—both in Pennsylvania; M. Howells, Orrville, Ohio. The office of the corporation within the State of Delaware is with the Capital Trust Co. of Delaware, Dover, Delaware. To manufacture and deal in automobile tires and tubes, and goods manufactured from rubber.

Wheeler Rubber Co., The, July 16 (Nebraska), \$25,000. A. E. Wheeler, M. Wheeler, R. E. McLeester. Principal office, Omaha, Nebraska.

LEE TIRE COMPANY IN NEW YORK OFFICES.

The general offices of the Lee Tire & Rubber Co., including all branches of the company's business except the production department, are to be moved from present quarters at the Conshohocken, Pennsylvania, factory to New York City. By October 1 the sales, executive and accounting forces will be installed in New York headquarters and the opening in New York of a large branch service station for the convenience of dealers in the vicinity and New England is also contemplated. These important changes will aid in the greatly increased output of Lee tires promised for next season.

LAUNCHING OF LONG-WEAR TIRES AND TUBES.

The new factory of The Long-Wear Rubber Co., Elyria, Ohio, is now completed and most of the machinery installed, the total cost being \$100,000. Within another month the company's product—automobile tires and tubes—will be on the market. At the last meeting of the board of directors, officers were elected as follows: William Seher, Lorain, Ohio, president; J. E. Murbach, Elyria, vice-president; I. N. Barber, Chicago, Illinois, secretary; W. E. Brooks, Elyria, treasurer; Charles J. Hodges, Elyria, general manager. Other directors are Henry B. Kishman, Vermilion, Ohio; J. J. Dauch, Sandusky, Ohio; C. H. Whitney, Oberlin, Ohio. B. W. Rote, Akron, Ohio, is factory manager.

CONVEYOR BELTING STRONGER THAN STEEL CABLE.

About the middle of June there were stored at the docks at St. John, New Brunswick, thousands of cases of shells waiting to be shipped for use abroad in the present war. So great was this weight that the wharf collapsed, not toppling over but simply



RUBBER CONVEYOR BELT HOLDING IMMENSE WEIGHT.

dropping straight down under the load. Over this warehouse was a grain conveyor having a rubber conveyor belt. When the warehouse collapsed this grain conveyor remained suspended in the air by the strength of the belt, which carried the weight of the conveyor, and when the second tide caused a further crash this tower slid along the belt until it reached Shed No. 5, as shown in the photograph. The authorities did not consider the belt sufficient to hold this great weight, and provided heavy steel cables to prevent further collapse. After these cables were placed the belting was cut, but when the next tide came in the cables broke and the conveyor came down with a crash. Rarely, if ever,

has there been a more severe test for a belt of this kind, or, in fact, almost any kind of a belt, and that it stood the test speaks volumes for the quality and workmanship of the manufacturer, the Canadian Consolidated Rubber Co., Limited, of Montreal, Canada.

TRADE NOTES.

Cutler-Hammer Manufacturing Co., Milwaukee, Wisconsin, has made the gift of a fellowship of \$400 for research work in physics to the University of Wisconsin, Madison.

The Canton Rubber Co., Canton, Ohio, has surrendered its certificate of authority to do business in the State of New York as a corporation, and the products of the company will in future be handled in that section exclusively by Lloyd P. Jones, 240 Broadway, New York City.

The United States Rubber Co. has bought 40,000 shares of its own stock and turned them over to employees on a profit-sharing plan.

The Federal Rubber Co., Cudahy, Wisconsin, held its annual picnic on August 18 at Waukesha Beach. There was an attractive program of athletic events and a flag-raising ceremony.

The Rubber Regenerating Co., Mishawaka, Indiana, has employed a number of women to take the places of men expected to be called under the draft law. It is said that the services of the women, who are doing regular routine work, are proving highly satisfactory.

To the McCoy-Nolan Supply Co., Milwaukee, Wisconsin, has been awarded the contract to supply the local fire department with 5,000 feet of 2½-inch double-jacketed fire hose; also the contract for 1,000 feet of 3½-inch fire hose.

The semi-annual style conference of the clothing department of the United States Rubber Co. was held at Grand Pacific Hotel, Chicago, Illinois, the first part of August, when a wonderfully attractive line of clothing, was shown for the examination of the buyers of the branch stores.

The United States Rubber Co. of California arranged a very attractive display of druggists' sundries at the recent convention of the California Pharmaceutical Association in San Francisco, this being the only exhibit of druggists' rubber goods. Mr. Van Inwagen, manager of that department, reports that the druggists evinced much interest in the display.

While the word "Substitute" has a definite and well-understood meaning in the rubber manufacturing industry, the term is undoubtedly suggestive of adulteration. The Stamford Rubber Supply Co., Stamford, Connecticut, has therefore adopted for its vulcanized vegetable oil products the term "Rubber Factice."

The Traun Rubber Co. has recently removed its offices to 239-243 Fourth avenue, New York City.

The Rubber Regenerating Co., Naugatuck, Connecticut, is erecting a new three-story brick warehouse, 320 by 66 feet, which will be used for manufacturing as well as warehouse purposes. The company is also building a 200- by 62-foot warehouse at its factory at Mishawaka, Indiana.

S. Birkenstein & Sons, scrap rubber dealers, Chicago, Illinois, have recently purchased from fifty to sixty thousand square feet on North avenue and Hawthorne street. No definite plans for building on this property have yet been formulated.

The Keystone Tire & Rubber Co., Inc., New York City, is now operating 32 stores and at its annual meeting on August 1 the board of directors resolved to continue opening stores until a maximum of 100 is reached. There were no new elections.

St. Louis, Missouri, appears to be on the very threshold of industrial opportunity. The "St. Louis Chamber of Commerce Bulletin" of late has an unusually optimistic tone and may prove an inspiration to new manufacturing business seeking a promising site.

HENRY N. MABERY.

HENRY NELSON MABERY, treasurer of The Savage Tire Corp. of San Diego, California, was born in Winchendon, Massachusetts, and educated in the Murdock Schools in that



H. N. MABERY.

town, which is noted for the extent of its wood working industries. In his youth he acquired a practical knowledge of every branch of the wood working machinery business, first with Baxter D. Whitney & Sons Co., of Winchendon, and later with the S. A. Woods Machine Co., of Boston, Massachusetts, and he had already assumed a prominent position in this industry when the state of his wife's health prompted his moving to a less rigorous climate. Twelve years ago he took up his residence at Los Angeles, California, where for ten years he engaged in the real estate business, and the beautiful sub-division between Los Angeles and Hollywood, named Mabery Heights, is a permanent testimonial to his development work.

In August, 1915, the Savage Tire Co., of San Diego, California, secured the services of Mr. Mabery for some special organization work, and the promptness and thoroughness with which this work was performed led eventually to his being appointed to a prominent position in the Savage organization, and he is now general superintendent of the Savage Tire Co., and secretary and treasurer of The Savage Tire Corp. During the period of Mr. Mabery's supervision the business of the company has grown so as to require very material enlargement, the addition of many modern machines and the installation of the latest manufacturing methods, and much of this is due to his business insight, activity and enterprise.

GOODYEAR PROMOTIONS.

The Goodyear Tire & Rubber Co., Akron, Ohio, has made the following changes in its branch managers:

B. S. Waterman, formerly branch manager at Boston, Massachusetts, has been placed in charge of the solicitation of manufacturers' business in all departments for the New England district.

W. A. Hazlett, formerly manager of the Detroit, Michigan, branch, has been appointed manager of the Detroit district.

P. E. Ammon, who has been special dealers' representative of the Detroit district, becomes assistant to Mr. Hazlett.

H. G. Norris, formerly manager at Toledo, Ohio, has been promoted to the management of the Detroit branch.

G. H. Hilbish has assumed charge of the Toledo branch, and is succeeded at Saginaw, Michigan, by W. D. McFarland, formerly a salesman in that territory.

F. W. Telford, who has been manager at Des Moines, Iowa, has been assigned to the manufacturers' division at Detroit.

R. E. Greene, former assistant manager at Minneapolis, Minnesota, succeeds Mr. Telford at Des Moines.

UNITED STATES RUBBER CO. APPOINTMENTS.

Recent appointments of the United States Rubber Co., New York City, include the following in the branch store department: Arthur W. Lawrence is made assistant to manager.

George E. Goodwin is promoted to supervisor of clothing and druggists' sundries.

Charles A. Blake becomes supervisor of footwear. He will continue to act in an advisory capacity on salesmen's operations.

T. B. Goodloe is now supervisor of tires.

W. C. Peterson, supervisor automobile accessories; and

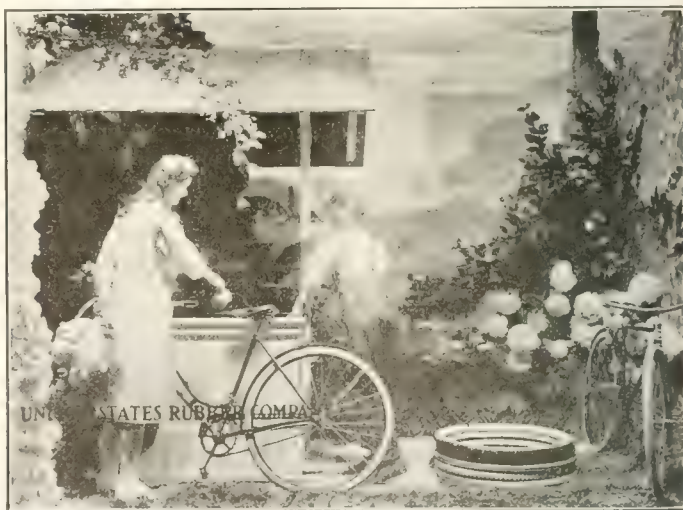
E. P. Cole, supervisor of mechanical goods.

PREFERRED STOCK FOR FEDERAL RUBBER EMPLOYEES.

As the result of requests from many of the employees of the Federal Rubber Co., of Cudahy, Wisconsin, for the privilege of purchasing an interest in the company, action recently was taken by the board of directors whereby a certain amount of second preferred stock of the company might be acquired. This stock, which is dividend-bearing, will, by reason of the limited number of shares available, be offered primarily to those employees holding positions of responsibility and whose terms of service with the Federal company cover a considerable period of time.

A BICYCLE TIRE WINDOW DISPLAY.

The United States Rubber Co. has in its building, 1790 Broadway, New York City, some of the best show windows in the city, both in the arrangement of the windows and the location for exhibiting the class of goods it carries. Last month all of its windows were fitted with tires of various kinds and grades made by the company, and the arrangement of the windows certainly proved that whoever had this in charge was a



real artist. Reproduced here is the display in one of the windows, which reminds one of the song, "The Old Oaken Bucket," it being intended to advertise bicycle tires. There was an ingenious blending of painted background with real flowers and shrubbery. Two bicycles were shown, together with tires having a variety of treads made by this company. Two children were represented as resting from their pedaling and quenching their thirst at the old well, and no doubt thousands stopped to study this and incidentally realized that the company manufactures quite a variety of bicycle tires.

The strength of France, commercially and financially, is briefly outlined in a booklet, "France and America, Their Mutual Interests and Obligations," published by the Guaranty Trust Co., of New York City, and which will be read with interest by exporters.

PEARCE ARROW TIRE COMPANY CHANGES ITS NAME.

At a meeting held on August 20 the stockholders of the Pearce Arrow Tire & Rubber Manufacturing Co. voted to change the name to Pearce Rubber Corporation and to increase the capital stock to \$1,000,000. The company now has ample working capital, in addition to paying for new machinery and equipment for its new factory, which will have a capacity of 1,000 tires per day.

TRADE NOTES.

The frequently recurring rumor, with ever-varying details, that the Ford Motor Co., Detroit, Michigan, is to manufacture tires for Ford cars remains without foundation in fact. The extensive building operations now in progress in the River Rouge district led to the belief that a separate tire making company was to be organized to conduct this enterprise on a separate basis, but THE INDIA RUBBER WORLD is advised that the Ford company does not contemplate increasing the size of its rubber department at the present time. Serious consideration has not been given to this matter, due to the enormous expansion of other departments with which the company is more familiar. However, experiments with tires and molded goods still continue and a limited quantity is turned out daily.

The Aero Cushion Tire Co., San Jose, California, has come under new management and is turning out tires to the full capacity of the plant. The new officers and directors are as follows: B. A. Herrington, president; A. P. Marston, vice-president; E. L. Sherbondy, superintendent; W. P. Wholheter, secretary; J. J. O'Shannessy, general sales agent.

Mention has previously been made in THE INDIA RUBBER WORLD of the complaints of several rubber companies against unfair railroad freight classification. The hearing in three of these cases assigned for September 22 at Akron, Ohio, has been postponed by the Interstate Commerce Commission, Washington, D. C., to a date to be hereafter fixed. The companies concerned are as follows: The Goodyear Tire & Rubber Co. v. The Akron, Canton & Youngstown Railway Co. *et al*; Kelly-Springfield Tire Co. v. The Akron, Canton & Youngstown Railway Co. *et al*, and The Batavia Rubber Co. v. Erie Railroad Co. *et al*.

The Consumers Service Tire & Equipment Co., Fulton, Illinois, incorporated under the laws of South Dakota, November 21, 1916, with a capital stock of \$5,000,000, has changed its name to Lincoln Highway Tire Co.

The Fisk Rubber Co., Chicopee Falls, Massachusetts, announces the opening of a new branch and service station at 212-14 S. Pinckney street, Madison, Wisconsin, on or about September 1.

The Osborne Engineering Co., of Cleveland, Ohio, has planned a factory for The Ideal Tire & Rubber Co., to be located at Warren Road, Cleveland, on a 75-acre tract. The plant will have three stories and basement and it is reported will cost \$150,000.

It is estimated now that the Mid-Continent Tire Manufacturing Co., Wichita, Kansas, will commence operation on September 10. Three Akron, Ohio, rubber men—W. E. Greer, R. E. Riley and B. L. Pontius—are to have charge, respectively, of the factory management, mill room and tube department.

The Johnstone Tire Co., of La Porte, Indiana, will manufacture a semi-solid tire adapted for delivery wagons. The tire, which is the invention of Samuel Johnstone, for whom the company has been named, carries a 10,000-mile guarantee.

The Sterling Tire Corp., Rutherford, New Jersey, which succeeded the Rutherford Rubber Co. last March, held its semi-annual convention of managers and salesmen on July 27 and 28, a feature of the occasion being the presentation of medals and prizes to members of the force for their accomplishments during the first six months of the year.

THE NEW FACTORY OF TUCKER MILLS, INC.

Such rapid progress has been made by Tucker Mills, Inc., Baltimore, Maryland, that the company has moved into new and larger quarters. The accompanying illustration shows the first plant, now outgrown. This business was started with six looms in April, 1916, as the Monumental Manufacturing Co., and was incorporated under the laws of Maryland in April, 1917, as Tucker Mills, Inc. Carded peeler fabric for cord tire construction has been the exclusive product, and so great has been the demand that, with the new facilities and machinery to be in operation in October, the output will be increased to 15,000 pounds weekly.

The officers of the company are: E. D. Hewins, president, Boston, Massachusetts; J. E. Tucker, vice-president and general manager, Baltimore, Maryland; Albert A. Blakeney, treasurer,



Baltimore, Maryland. All are men of long experience in the cotton duck and tire fabric trade. The product of the mill is sold through E. D. Hewins, 72 Lincoln street, Boston, Massachusetts.

OHIO RUBBER SHIPPERS ORGANIZE.

The Northwestern Ohio Rubber Shippers' Association has been formed to enable those firms engaged in shipping crude rubber and rubber products in the Akron territory to act jointly in handling the traffic problems that are continually arising and in which all have a common interest. It is also hoped that this association will furnish a convenient medium of cooperating with the railroads in effecting changes and improvements in traffic conditions.

The present Akron members include The B. F. Goodrich Co., Firestone Tire & Rubber Co., The Goodyear Tire & Rubber Co., The Miller Rubber Co., and General Tire & Rubber Co. Other members are the Portage Rubber Co., Barberton, Ohio; McGraw Tire & Rubber Co., East Palestine, Ohio; Marathon Tire Co., Cuyahoga Falls, Ohio; The Republic Rubber Co., Youngstown, Ohio.

The officers are as follows: F. C. Van Cleef, president; E. C. Knox, vice-president; E. L. Tragesser, treasurer; executive committee, R. G. Kreidler, chairman, E. L. Morgan, H. S. Bryant, E. C. Knox, E. L. Tragesser, A. C. Redman, L. H. Ley, W. D. Morris.

THE RUBBER TRADE IN AKRON.

PERHAPS the latest and most reliable statistics regarding Akron's great rubber industry were given in an article for the July issue of "Export American Industries," by Vincent S. Stevens, secretary of the Akron Chamber of Commerce. This article entertainingly reviews the phenomenal growth of this "city of opportunity," its present variety of industry and extent of civic and social work and improvement. It is pointed out that in addition to its gigantic rubber goods factories, Akron has one of the largest cereal mills in the United States, very extensive clay product plants, large book publishing houses, extensive furnace factories, important agricultural implement interests, and one of the largest fishing tackle factories in the world.

Regarding the rubber industry, Mr. Stevens writes:

The first rubber factory in Akron was established in 1869, in a building 40 by 100 feet in size, with 25 employees. Akron at that time was a town of 10,000 inhabitants with a somewhat limited reputation as a promising town of cheap canal transportation. This pioneer company has grown to be the largest rubber factory in the world, employing at the present time 19,000 persons and covering a floor space of 90 acres. It is said that this company makes no less than 8,000 different and distinct articles. Other rubber companies have multiplied until there are now 24 active companies in Akron, with a combined output of 50,000 tires and an equal number of tubes per day, besides immense quantities of rubber clothing, boots and shoes, hose, belting, surgical and druggists' goods, and an almost innumerable variety of other hard and soft rubber articles. These companies have an aggregate capitalization of \$171,000,000, and employ a total of 55,000 persons. Of the total of 120,000 tons of crude rubber imported into the United States in 1916, 60,000 tons were consumed by the Akron factories. Of the estimated demand of 20,000,000 tires needed this year for the 4,000,000 automobiles in use in this country, 15,000,000, or 75 per cent, will be made in Akron.

* * *

Labor Day for Goodrichites will be a dizzy round of pleasure, according to the plans for the second annual field day of The B. F. Goodrich Co. The varied activities will appeal to all tastes, and there will also be novel features, such as a "secret" handshaker, who will pass \$10 to the fiftieth person shaking hands with him during the day. The program of events includes the following:

Folk Dances—Russian, Macedonian, Croatian, Lithuanian, Italian Tarantella; fencing exhibition; tableaux and national dances; soccer—Goodrich "Bearcats" vs. Goodrich "Tigers," prize of \$27.50 to winning team; numerous track and field events for men, and special events for women, with money prizes for each event; horseshoe pitching contest, prize of \$10 to the winner; tennis singles and doubles for both men and women, \$5 prize; cricket—Goodrich "Eagles" vs. Goodrich "Hawks," prize of \$27.50 to winning team.

* * *

The Goodyear Tire & Rubber Co. will also hold a big picnic and field day at Seiberling field on Labor Day, for which many events are being planned.

The Goodyear motor truck service from Akron to Boston has proved a decided success and four large trucks are now used, carrying tires to the East and returning laden with tire fabric from the Goodyear Cotton Mills, at Goodyear, Connecticut.

* * *

The August issue of "The Firestone," the house-organ of the Firestone Tire & Rubber Co., contains an interesting editorial entitled "Open Wide the Windows of Your Mind," in which all-round development and breadth of vision are urged as valuable assets for the men who make a business of the manufacture and sale of tires.

* * *

The total volume of business done by the Miller Rubber Co. in the first 7 months of 1917 shows an increase of approxi-

mately 85 per cent over the corresponding period of last year. In 1916 the volume between January 1 and August 1 amounted to \$3,599,000. In the corresponding period of this year, the total volume amounts to \$6,605,000.

The comparative sales for each month are as follows:

	1916.	1917.
January	\$416,780	\$706,160
February	347,786	774,646
March	502,755	856,257
April	466,145	1,082,869
May	585,597	1,055,316
June	658,768	1,091,162
July	650,205	1,039,463
	\$3,599,037	\$6,605,776

* * *

The Mohawk Rubber Co. recently completed an addition to its factory and has installed new equipment, including boilers, mills and calender. A permit has been secured to build a new garage, to cost approximately \$30,000, to house the company's cars and trucks and those of some of the employees who use their cars in going back and forth to work. This building will also include a carpenter shop and some additional storage space, and will be constructed of brick, iron and concrete. The Mohawk company is now running to full capacity, and by the addition of some curing capacity will probably increase its production about 20 per cent during the coming year.

* * *

The Kendall Tire & Rubber Co. has purchased the factory and equipment of the Meyer Rubber Co., at Massillon, this state.

* * *

The O'Neil Tire & Rubber Co. has increased its capital stock from \$25,000 to \$100,000, in order to finance its rapidly growing business. Plans have been completed for a new factory building which will increase the present space fivefold. The O'Neil company manufactures tire accessories, air bags and tire repair equipment, and intends adding the manufacture of soles and heels and other rubber specialties to its lines.

* * *

In order to conserve its resources and not draw on capital and surplus at the present time, The Swinehart Tire & Rubber Co. recently paid its regular quarterly dividend of 1½ per cent on common stock in new preferred stock script instead of cash. The company took action early in the Spring to authorize an issue of \$500,000 preferred stock, anticipating the conditions that have since prevailed, but owing to the declaration of war on April 12, the issue could not be floated except at a sacrifice, which the company did not feel it advisable to consider.

* * *

H. Q. Tennant has been given charge of sales in the home office of The American Rubber & Tire Co. Mr. Tennant has had considerable experience with several of the larger rubber factories, principally in sales promotion work.

THE RUBBER TRADE IN RHODE ISLAND.

By Our Regular Correspondent.

THE rubber plants in Rhode Island are running at capacity, following necessary shut-downs for stock taking, overhauling and repairs of machinery, etc. Notwithstanding the fact that the production from every plant is far in excess of that ever before credited to them they are still behind their orders, and indications are that the rush will continue for months to come.

* * *

The Alice Rubber Shoe Mill, of the Woonsocket Rubber Co., at Woonsocket, which employs 1,500 operatives, resumed operations on August 17, and the Millville rubber mill and the felt mill of the same company, at Millville, are now in full operation after the vacation period.

* * *

After a shut-down from August 13 to 20, business at the

American Wringer Co., Woonsocket, is driving and great difficulty is being experienced in producing an output that will maintain anywhere near an equalizing pace with the orders that are being received. For the first time in its history the concern has introduced female help in its factory, 12 entering the finishing room during the past month. They are employed in tying the guarantee tags and doing light varnish work, and if the experiment proves successful, Manager J. P. Walsh states that the firm will employ more girls in some of the departments.

* * *

Percy A. Greenwood, assistant foreman in the finishing department of the American Wringer Co., concluded his duties on August 11, having passed his examinations for the National Army. He was presented a sum of money by his fellow foremen and office force.

* * *

Assistant Superintendent Charles J. Burns, of the Tubular Woven Fabric Co., Pawtucket, a member of Battery B, Rhode Island Battalion of Light Artillery, and Michael Cresendo, overseer of the paper room and a member of Battery C, were called into service the past month and are now with their commands at the mobilizing camp at Boxford, Massachusetts. Previous to their departure they were tendered a farewell reception, and a number of articles that will be useful and valuable to them during their service were presented by William Whitaker, a member of the office force.

* * *

The National India Rubber Co., at Bristol, is repairing and improving its property, and is overhauling and installing machinery. A substantial granolithic sidewalk, more than 800 feet in length, has been completed in front of the entire factory. A granolithic retaining wall, the length of the mill, has been constructed, which will be surmounted by an ornamental iron railing. Piers at each side of the main entrance will hold electric lights in ornamental brackets. Trees are to be planted in the spaces near the curbing along the walk to take place of those recently removed.

An important improvement is the enlarging of the boiler house, which will soon be completed. The upper part of the old boiler house is to be extended 10 feet higher, the addition to be of brick, with steel trusses and topped by a sheet iron roof. Plans have also been completed and bids are being asked for the erection of a new brick manufacturing building, three stories high, on which work is to be commenced at as early a date as possible.

* * *

Following their vacation periods, the daily output of rubber footwear from the National India Rubber Co.'s plant at Bristol averages 49,000 pairs, and the Narragansett Rubber Co., of Bristol, 14,000 pairs.

* * *

The O'Bannon Corporation, formerly known as the International Rubber Co., at West Barrington, is adding a number of calenders, and other new machinery is being installed to meet the increasing demand.

* * *

A fire, early last month, in the chemical room of building No. 2 threatened the entire plant of the Revere Rubber Co. It probably started from an explosion, which shattered containers and liberated a considerable amount of acid. Employees trying to hold the flames in check were overcome by the acid fumes, as were also, later, several firemen. The promptness of the fire department saved the plant from a repetition of the disastrous and fatal fire at this plant in 1912, but the loss of stock was considerable.

The Revere company is making extensive alterations and additions to its three-story factory building on Valley street.

* * *

The first dividend of 10 per cent in the matter of the Cataract Rubber Co., of Providence, has been declared by Referee in

Bankruptcy N. W. Littlefield and is now being paid to the creditors of record.

* * *

The Hope Webbing Co., Pawtucket, which is one of the largest manufacturers of narrow woven and braided fabrics in the country, is installing a number of new looms which, it is claimed, will increase the plant's production nearly one-third. The concern already operates between 1,000 and 1,100 looms and 250 braiders.

THE RUBBER TRADE IN BOSTON.

By Our Regular Correspondent.

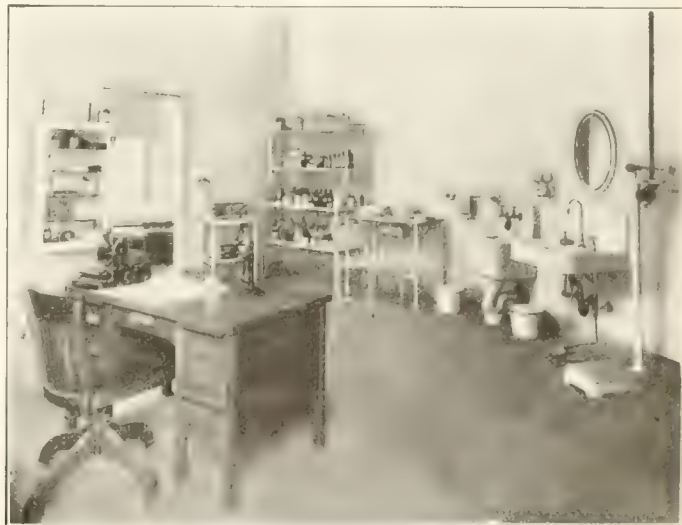
AT a recent meeting of the Hood Rubber Co., Watertown, an increase of preferred capital stock of \$2,250,000, and an increase in common capital stock of \$1,000,000 were authorized. The preferred stockholders voted unanimously to exchange the old preferred stock for new preferred stock, share for share.

The directors have voted to issue 12,500 shares of preferred stock, and a large amount of this stock has already been subscribed for. They also voted to issue 5,000 shares additional common stock for subscription at par to holders of common stock of record at the close of business August 11, with rights to subscribe for one new share for every five old shares. It has been deemed advisable to terminate the voting trust which held a large majority of the common shares of the company, and the voting trust certificates are being called in for exchange for shares of the common stock of the company.

The Hood Rubber Co. is now showing a line of tennis shoes for the season of 1918 which includes a number of styles furnished with the pneumatic rubber heel on which the company own the patent. The Hood company claims to be the first to manufacture heel tennis shoes and also the first to exploit tennis shoes with the high Louis or Cuban heel similar to leather shoe styles for women. Another novelty is a line of workmen's and children's shoes with duck upper and rubber and fiber soles, which are expected to have a wide sale because of the high cost of leather footwear. This concern is vulcanizing its tennis lines under the pressure cure. Orders are already piling up for January to March delivery, and the tennis department is being run to capacity to enable the company to ship at dates indicated.

* * *

The Boston Woven Hose & Rubber Co. now has, at its factory in Cambridgeport, a fully equipped first aid hospital for the immediate treatment of employees who may be taken ill, or



injured. A trained nurse and an assistant are in constant attendance, and a physician is at the plant every day between 8.30 and 10 A. M. Safety stations have been established at convenient points in the various buildings of this extensive plant,

each of which is equipped with a stretcher, blankets, and a first-aid jar with complete supplies. At the hospital two rooms are provided and the equipment consists of an operating table of white enameled iron, bed and chairs of the same, an instrument cabinet of plate glass and white enameled iron frame, a medicine cabinet, chest of drawers for bandages and supplies, a sterilized white enameled sink, hot and cold water and all necessary instruments. Even such late inventions as the French Ambrine treatment, and Dakin's new antiseptic are provided. For such surgical cases as are beyond the scope of this factory hospital, arrangements have been made for immediate ambulance service, and provision for treatment at a local hospital, where beds have been engaged for workers who may be injured in the service of the company.

* * *

The Apsley Rubber Co. is very busy on manufacturing rubber blankets for the United States soldiers who have gone or are about to go to France, and although the company has a large amount of orders for its regular lines, these have been side-tracked in order to deliver the army goods in as large quantities and at as early dates as possible. Mr. Apsley, in a recent interview, said:

My plant is at the disposal of the United States Government for the manufacture of articles needed for the Army and I have made this offer in a spirit of patriotism. My company does not want to reap wartime profits but it wants to be of help in a time of the country's great need.

In the old days men enriched themselves when the nation was at war, but I would prefer to abandon this big plant built up during thirty-two years of endeavor rather than submit an inferior article to Uncle Sam for the use of the boys who are fighting our battles.

Our growth here is something we are proud of and we are going to cling to the old traditions.

* * *

Mention has frequently been made of the athletic activities of the employes of The Fisk Rubber Co., Chicopee Falls, this state, and of Fisk Park, the thirty-acre recreation ground, where ball games, amateur and semi-professional, are played every Saturday. In addition to its two base ball diamonds, three tennis courts, and a half-mile running track, a football gridiron has been laid out recently, basket ball courts have been added, and a hand ball court is in process of construction. This enterprise, though fostered by the company, is entirely in the hands of the employes, the expenses being raised by the one dollar membership fees, and by the athletic meets, and entertainments at which admission is charged. The Fisk Red Tops, which is one of the seven baseball teams, will meet several of the Western rubber factory teams of Akron, Cleveland and Detroit during its Western trip this season.

* * *

The Plymouth Rubber Co., Canton, this state, has elected a new board of officers as follows: James A. Clifford, president; Charles W. McDermott, vice-president, and J. E. Stone, treasurer. These and A. Sydeman, J. C. Haartz, W. G. Thomas and Marshall Cutting are the newly elected directors.

Mr. Clifford, the new president of the company, was until recently superintendent of manufacturing and reclaiming for the Boston Woven Hose & Rubber Co., of Cambridge, at its Plymouth plant. Previous to his nine years' service with that company he was connected with the United States Rubber Reclaiming Co. at Naugatuck, Connecticut, and his scientific and chemical education and practical experience make him a valuable acquisition for the Plymouth Rubber Co.

W. E. Kavenagh, the new factory manager of the Plymouth company, has been connected with the rubber business ever since 1899, and in 1900 was employed by The Goodyear Tire & Rubber Co., Akron, Ohio, as foreman, which position he left to take a four years' course at Harvard University, when he again

entered the employ of that company, taking charge of the chemical laboratory and deresinating plant, afterwards going as superintendent of the Goodyear plant in Canada. Just previous to his present connection he was associated with the Swinchart Tire & Rubber Co., Akron, Ohio, as general superintendent.

A general line of mechanical rubber goods will now be developed in addition to the present product. It is reported that the Plymouth Rubber Co. did a gross business of \$3,000,000 last year.

CANADIAN NATIONAL EXHIBITION.

The thirty-ninth Canadian National Exhibition is being held at Toronto. Over 1,000,000 visitors are expected. The grounds are situated on the shore of Lake Ontario, and extending along the water front for upwards of a mile, comprise 264 acres. Some of the principal buildings are:

MANUFACTURERS' HALL. Industrial arts and crafts, contains 72,500 square feet of space. A second building has approximately the same area, making a total of 145,000 square feet for the display of manufactured products.

MACHINERY HALL AND ELECTRICAL BUILDING. Heavy machinery and machinery in operation. It is equipped with ample steam power and shafting for the purpose, and has a floor space of 35,000 square feet.

INDUSTRIAL AND PROCESS OF MANUFACTURE BUILDING. A modern brick and steel structure with 76,500 square feet of floor space.

SCRAP RUBBER DEALERS FIGHT NEW YORK JUNK ORDINANCE.

Scrap rubber is included in the list of waste materials specified in the Junk Dealers' License Ordinance recently passed by the Board of Aldermen and approved by the Mayor of New York City. Under the provisions of this ordinance "anyone dealing in the purchase and sale of *** rubber *** in large or small quantities, shall be known as a junk dealer and his place of business a junk shop." Junk licenses must be procured and all merchandise must be kept in their possession at least 48 hours after purchase.

As it is manifestly unreasonable to classify persons engaged in the wholesale rubber business exclusively as junk dealers and to compel them to comply with the rigid provisions of the ordinance, several of the largest New York dealers in rubber scrap have retained Reit & Kaminsky to confer with the Police and License Departments regarding the matter. This law firm was also retained by the Wholesale Wool Stock Merchants' Protective Association and the Associated Dealers in Paper Mills Supplies of New York and succeeded in having the ordinance amended to exclude persons engaged exclusively in the purchase and sale in large quantities of scrap iron and steel, woolen rags and paper stock, and requiring only that each person shall annually file with the Commissioner of Licenses a statement in writing setting forth the name and address of such person and the character of his business. There is reason to believe that scrap rubber dealers will be placed on a similar basis.

THE LENGTH OF THE WORKING DAY.

The question of reduction of the hours of labor in manufacturing establishments is a most important one, and one which is continually being agitated. The National Conference Board is sending out a schedule of inquiries to manufacturers to secure such statistical information on this point as may be available when demands come for a further shortening of the working day. The Rubber Association of America, which is a member of the National Conference Board, is advising its members to fill out the blanks furnished them, and mail them to the office of the Board, 13 Beacon street, Boston, Massachusetts.

The Rubber Trade in Great Britain.

By Our Regular Correspondent.

NOW that we are all in the same boat there is no object in harping upon the altered conditions which war has imposed upon our rubber trade, as no doubt they have now been reproduced in America. The main feature of the moment throughout England is that anybody who has anything to sell does so at an enhanced price, in many cases beyond what is justifiable. The buyer enters a mild protest, but goes on buying, and if he is in business passes on the extra cost to his own customers. This might form an appropriate exordium to remarks on the position created by the recent advances in rubber goods notified by the India Rubber Manufacturers Association, but the subject cannot be ventilated in a few lines, and we are exhorted to be careful in the use of paper.

One of the busiest branches of the trade in non-war goods is the cycle tire department, the cycle having come into its own again in a marked degree, owing to the embargoes on and expense of other forms of locomotion. Moreover, the fine summer which has upset the calculations of the mackintosh and oil-skin makers has been conducive to pleasure cycling.

An unusual incident of the hot weather occurred during a thunderstorm on July 16, when the rubber works of Broadhurst & Co., Limited, Manchester, were struck by lightning and set on fire. The outbreak was soon subdued by the fire brigade and no interruption to business was experienced, but several work-people sustained injuries from broken window glass.

SURGICAL GOODS.

Naturally since the war began there has been an increased demand for surgical goods of various kinds, including what are generally known as druggists' sundries. In this sort of work, especially in certain classes of surgical goods, the French have always been the principal producers, and British surgeons have been in the habit of insisting upon certain articles being of French manufacture. Until quite recently, I believe, the particular American made articles which are now being sold in Britain were not made in America, and it has been suggested that what have been coming to us during the last two years were really of German origin. It is also said that a good deal of what was sold as of German make in pre-war days was really of French origin. The difficulty with the four or five British rubber works which specialize in surgical goods is to get them to make patented specialties. They say the prospective business is not large enough to tempt them to enter into it, and in such cases as they have undertaken, the prices charged for the manufacture of specialties have often been such as to prevent the patentee from doing anything like a large business. At the present time, owing to diminution of staffs and congestion of work, it is not surprising that delivery is much behind hand on orders that have been taken. One consequence of this—and the same thing applies to various other patented rubber goods—is that people quite outside the rubber trade are seriously considering the feasibility of going into rubber manufacture to a certain extent on their own account. This is a development that, when normal conditions return, will probably not commend itself to the large rubber works. They may, of course, console themselves with the thought that the new comers will lose money and be glad to revert to old-time procedure. Though it does not come under my paragraph heading, I may say that an important bicycle manufacturing firm is considering the manufacture of rubber tires.

THE INDIA RUBBER MANUFACTURERS' ASSOCIATION, LIMITED.

The outstanding feature of the statement made by J. T. Goudie, the chairman, at the annual meeting was the fact that

the 30 firms which are now members included such large concerns as Warne, Silvertown, and Scotch firms which had hitherto held aloof. The increase in the membership and the continually widening scope of its work has rendered the formation of various district and sectional committees imperative, and several of these sections, notably those dealing with waterproof garments, have been for some time at work. The general committee of management, which was elected at the meeting, contains several interesting names new to the association: Chairman, J. T. Goudie (Leyland & Birmingham Rubber Co., Limited); vice-chairman, Hugh C. Coles (Wm. Warne & Co., Limited); committee, P. A. Birley (Chas. Macintosh & Co., Limited), W. E. Birrell (Clyde Rubber Works, Limited), J. H. C. Brooking (St. Helens Cable & Rubber Co., Limited), A. Cairns (A. Cairns & Co.), M. Frankenburg (I. Frankenburg Sons, Limited), G. C. Mandelberg (J. Mandelberg & Co., Limited), P. Maclellan (George Maclellan & Co.), David Moreley (David Moreley & Sons, Limited), T. C. Redfern (Redfern's Rubber Works, Limited), Stuart A. Russell (The Silvertown Co.), James Tinto (Irwell & Eastern Rubber Co., Limited). In concluding his address the chairman said that it was very gratifying for the old committee as it retired to make way for a more widely extended representation, to note that all traces of former friction had disappeared and that there prevailed among the whole of the members an excellent spirit of concord and mutual confidence.

THE CHEMISTRY OF VULCANIZATION.

This was the title of a paper contributed by Dr. D. F. Twiss, chief chemist of the Dunlop Rubber Co., Limited, at the Chemical Congress held at Birmingham in July on the occasion of the annual meeting of the Society of Chemical Industry. The paper, which was a long one, cannot be usefully abstracted in the space available and I shall therefore confine myself to noting a few of its items. As a prefatory remark I may say that it is a matter of some international importance to the trade that the Dunlop company, following the lead of the North British Rubber Co., Limited, has abandoned the old established procedure of British rubber manufacturers and has allowed some of its laboratory work to be published and discussed. This is a matter for which the trade will join with the writer in his expressed indebtedness to J. V. Worthington, technical superintendent and director of the Dunlop company.

Owing to the difficulties of dealing with a body which is obtained chemically pure with exceedingly great difficulty, there remained yet many points, he said, in connection with the rubber industry of which the scientific interpretations are contradictory, vague, or based on quite insufficient evidence. Nevertheless, more especially during the last ten years, extraordinary advances had been made in the chemistry of rubber.

In the earlier days of the plantation rubber industry considerable stress was laid on the variability in the rate of vulcanization of plantation Para as compared with wild Para rubber. An explanation was to be found in the discovery of Eaton and Grantham that if the soft slabs of coagulum are allowed to "mature" for several days before the retained serum is expressed the resulting rubber vulcanizes with unusual rapidity, the effect attaining its limit after a period of, roughly, seven days before washing and crepeing. The advantage of a uniform supply of such rapidly vulcanizing rubber for special purposes would readily be recognized, said Dr. Twiss, who added that it should be specially marked for sale. In the subsequent discussion Dr. Stevens, of London, said the labeling of such rubber was of great importance, otherwise the complaints as to vari-

... maturing oxidation took place, weakening the surface. After discussing the action of inorganic accelerators, Dr. Twiss went on to speak of organic accelerators and said that one of the most powerful of these organic catalysts is aldehyde ammonia, its effectiveness far outweighing what might be expected of its ammonia content. It was a remarkable circumstance that almost the whole of the known effective organic accelerators are basic, their activity depending upon their relative alkalinity. The alkali hydroxides were strong accelerators. For a long time it had been known that alkali reclaimed rubbers vulcanized with exceptional rapidity. It had been shown that a small percentage of powdered caustic potash caused a greatly increased rate of vulcanization in a mixture of rubber and sulphur. He came to the conclusion several years ago that the action of both inorganic and organic acids depended upon their basicity and that the action of the latter was more pronounced only because they were soluble in rubber and therefore more evenly distributed.

Dr. Twiss then went on to describe some interesting experiments he had made with a 25-per cent solution of caustic potash in glycerol. Some results were using a mixture of 95 per cent rubber and 5 per cent sulphur, residual free sulphur 3.6 per cent, with 2 per cent glycerol accelerator 0.31 free sulphur; with 1 per cent aldehyde ammonia 0.17 free sulphur; with 1 per cent para-nitroso dimethylaniline 1.5 per cent free sulphur. The nitroso compound was much more effective in mixings containing a high percentage of sulphur than with those with a relatively low proportion and this would account for its very partial success in low sulphur, litharge or antimony mixings. Turning to other topics, he mentioned that the evidence for the supposed vulcanization of a rubber sulphur solution at the ordinary temperature by ultraviolet light was unconvincing. In concluding, he expressed the view that what he had said was not only indicative of great activity in rubber chemistry, but would also indicate how wide are the gaps of knowledge which at present are bridged over by mere theories and need to be filled up with a solid mass of experimental evidence.

This paper was followed by one on "The Scientific Needs of the Rubber Industry," by B. D. Porritt, chemist to the North British Rubber Co., Limited. This paper was in the main a plea for the establishment of more laboratories in rubber works, it being pointed out that the industry required research laboratories as well as the routine laboratories which had sprung up since the advent of the much abused specification. While the laboratory might be accepted by some manufacturers as a valuable adjunct, it was as yet not recognized as an essential. The research laboratory he recognized would be only within the means of the largest works, but with the more general cooperation which might now reasonably be expected the results could be used to benefit the trade as a whole. A beginning had been made by the inclusion of some rubber manufacturers on an Advisory Research Committee of the Imperial Institute, but there was room for a much greater measure of commercial and scientific cooperation, this being a good time for this development because the abnormal trade conditions and national needs had for a while deadened trade competition and petty jealousies and had necessitated many conservative manufacturers abandoning the traditions of a lifetime. In the course of the interesting discussion which ensued, Dr. Twiss said that too much blame seemed to be laid on the manufacturers for neglecting research. The manufacturers were not out to benefit other people and had no sympathetic regard for the constitution of rubber, which seemed an unimportant matter from their point of view. A good deal of research had been done, but from mistaken motives the manufacturers had not allowed it to be published. A good deal of the research done in accelerators, for instance, had been crude and disconnected. Altogether there was a much greater excuse for the rubber industry not having raised its pure chemistry to

a higher stage than would appear at the first casual glance.

Dr. Stevens said that now was the time for the manufacturers, through their association, to make arrangements to start research. Mr. Sproxton said he thought that the sting of the paper had been drawn by the paper which went before, and the president of the society, Dr. C. C. Carpenter, agreed with this remark, the previous paper having told them that there were, at any rate, some manufacturers who were far seeing and who understood the value of scientific investigation and, what was more important still, allowed the results of these investigations to be brought to the notice of the industry generally.

BRITISH WAR ORDERS.

Proofers to the trade are now being kept busy by government orders for proofed shoe lining. Great quantities of tan duck are also being proofed to tan twill for government purposes such as valises, stretchers, bags of all kinds and hold-alls, besides cloth for gas-masks. The latter take a very long time in proofing, as a number of rubber coatings are necessary before the required specifications are attained. The government has also put out orders for covers for caps, bonnets, breech-loaders and Lewis guns.

Large quantities of rubber thigh boots have been secured by the War Office for winter use in the trenches. These were formerly obtained from Canada and the United States, as practically only one British firm could produce such boots, but now new firms have taken up their manufacture, and it is no longer necessary to depend on supplies from overseas.

BRITISH REQUISITION OF CARNAUBA WAX.

The Army Council intends to take possession of all stocks of carnauba wax, excepting stocks of less than two tons, that are at present or may arrive in the United Kingdom. All holders must, therefore, make full returns of their stocks, giving particulars of quantities, descriptions and cost prices to the Director of Army Contracts.

BRITISH INDIAN AUTOMOBILE CONCESSION WITHDRAWN.

In connection with the prohibition of the importation into British India of motor cars, motorcycles, and parts, it is learned that the Indian Government will withdraw the concession under which it was decided to admit, under license, cars, motorcycles and parts actually paid for before December 23, 1916, except in the case of cars shipped before August 1, 1917.

SUSPENSION OF THE KEW BULLETIN.

The announcement that this important journal is to be suspended under pressure of war economy and scarcity of printing materials, has roused a storm of protest. This organ not only serves to circulate the results of scientific activities at Kew, but also places at the disposal of the economic and scientific gardens in India and the colonies the latest facts in pure and economic botany that may be of importance to them.

THE EXCESS PROFITS DUTY AND PLANTATION RUBBER.

From the very outset the Rubber Growers' Association, London, England, has, under the best advice obtainable, taken vigorous measures to procure some amelioration of the hardship and inequalities to which many plantation rubber companies are subject under the Excess Profits Duty provisions of the British Finance Act of 1915, which imposes a uniform 10 per cent standard on the basis of capital. Particular attention has always been given to the interests of what have been termed "young producer" companies which are so heavily hit by a datum line based on the inadequate percentage standard allowed by the Board of Referees and figured on profits earned prior to the

outbreak of the war. Deputations have been heard by the Chancellor of the Exchequer and the Commercial Committee of the House of Commons, with the result that while the Finance Bill of 1917 as issued does not contain the general clause or amendments suggested by the Rubber Growers' Association, a provision is made to lessen after December 31, 1916, the hardship arising from the Vallambrosa judgment.

During the debate in the House of Commons the Chancellor of the Exchequer stated that while one industry could not be dealt with in a general tax in one particular way, the Treasury would not be opposed to a rehearing by the Board of Referees, and the Rubber Growers' Association has determined to continue the matter along that line. Meanwhile, as a result of representation on behalf of the association a new clause has been added to the bill by the Treasury sanctioning referring to the Board of Referees any application regarding a class of trade or business, and permitting closed cases to be reopened and orders revised if deemed advisable.

RUBBER FOOTWEAR IN NEW ZEALAND.

According to Consul General Alfred A. Winslow, at Auckland, New Zealand, the United States practically controls the New Zealand and market in gum boots, but there has been quite a falling off in the trade for 1916. The American gum boot is considered better than any other, unless it be the Canadian boot. The imports of gum boots for three years are here shown.

From	1914.		1915.		1916.	
	Dozen pairs.	Value.	Dozen pairs.	Value.	Dozen pairs.	Value.
United Kingdom	223	\$11,247	100	\$5,270	56	\$3,582
Canada	360	11,688	309	8,755	285	8,730
Australia	14	743	24	1,732	3	200
United States	1,272	48,945	1,286	45,550	1,029	38,947
All other countries .....	.....	19	.....	.....	.....	.....
Totals	1,869	\$72,642	1,719	\$61,307	1,373	\$51,459

In galoshes and overshoes of rubber, gymnasium shoes, etc., Great Britain sent the largest, Canada second, and United States the third largest amounts. American manufacturers do not seem to be holding their own in these lines, possibly because of the preferential import duty which favors the United Kingdom. The imports are as follows:

From	1914.		1915.		1916.	
	Dozen pairs.	Value.	Dozen pairs.	Value.	Dozen pairs.	Value.
United Kingdom	24,167	\$86,624	24,729	\$86,667	21,492	\$88,809
Canada	3,160	22,746	2,690	17,695	3,069	19,408
France	216	516	30	228	.....	.....
Sweden	71	326	283	1,120	113	389
Japan	18	29	116	418	736	2,151
United States	2,850	17,807	2,406	15,014	1,546	9,426
All other countries	100	418	10	39	80	146
Totals	30,582	\$128,466	30,264	\$121,181	27,036	\$120,329

A 1 per cent war tax is collected on all imports into New Zealand. Galoshes and overshoes of rubber, gymnasium shoes, etc., pay a duty of 22½ per cent from the United Kingdom and possessions and 11¼ per cent additional from all other countries, plus the war tax. Gum boots enter free of duty from all countries, with the exception of the war tax.

MOTOR CAR IMPORT LICENSES DISCONTINUED IN FRANCE.

A Ministerial Notice, published in the French "Journal Officiel" for July, is to the effect that no further licenses will be granted for the importation into France and Algeria of motor cars and motor lorries except in cases where it is proved that the vehicles were despatched direct to France or Algeria at a date prior to the publication of the notice.

RUBBER SPONGE IN TREPANNING.

For closing a hole in the skull Dr. C. Scandota, of Naples, uses rubber sponge. He reports to "La Riforma Medica" that he tried it on a rabbit and a dog, which he killed after nine and six months and found that except for slight loose adhesion to

the dura, the rubber sponge was unchanged. It had caused no trouble and the animals had behaved normally.

FRENCH WEST AFRICAN EXPORT DUTY.

The valuation of rubber exported from French West Africa from April 1 to October 1, 1917, has been fixed for the purpose of assessing export duty, at 500 francs per 100 kilograms [about \$100 per 220 pounds] for exports from Senegal, French Guinea, the Ivory Coast (including Assini), and Dahomey. Export duty is leviable at the rate of 7 per cent on the valuation.

COMPILATION OF RUBBER GOODS IMPORT STATISTICS IN HOLLAND.

In view of the possible resumption of the importation of rubber articles into Holland in the near future, The Netherlands Oversea Trust Co. has issued a request that those interested should send a written statement, mentioning countries of origin, of the quantities and weight of rubber articles, excepting tires, which they have imported directly during the last three years, whether for home consumption or reexport. In case of an increase in the imports, this was to be stated, as well as the reasons for such increase.

THE NETHERLANDS EXPORT COMPANY.

While war conditions disturb the normal exchange of goods between Holland and foreign countries, this company, recently formed at The Hague, will endeavor to provide for the exportation of Dutch wares, and promote the importation of articles of which there is scarcity in Holland. The activities of the company are controlled by the Minister of Agriculture, Industries and Commerce, who can order its liquidation when he considers that its existence is no longer necessary.

FOREIGN TRADE REPORTS.

AUSTRALIA.

ACCORDING to the latest statistics, Australia imported during the fiscal year ending June 30, 1916, rubber manufactures to the value of \$3,774,120, of which \$2,314,935 represented importations from the United States. These totals embrace tire rubber, rubber-tire fabric, tires, tubes, rubber stoppers or corks, rubber hose, bandages, elastic stockings, hatmakers' press bags and rings, gas bags, soles, pads and heels, and crash mats. India rubber, crude or powdered and reclaimed, rubber waste, and hard rubber in sheets were imported to the value of \$2,430,775, principally from Brazil, Ceylon, Straits Settlements, the United Kingdom, Peru, and Samoa; only \$42,380 was imported from the United States. Rubber thread, boot and apparel elastic, masticated rubber, syringes, and similar manufactures totaled \$186,050, the United States supplying \$17,140 worth. In the 10 months from June 30, 1916, to April 30, 1917, Australia imported india-rubber goods to the value of \$4,397,150, but the share of the United States is not given in the published returns now at hand.

SOUTH AFRICA.

During the past five years the imports of rubber goods into South Africa were: 1912, £42,191; 1913, £35,603; 1914, £34,083; 1915, £325,338; 1916, £520,145.

THE AZORES.

Imports of rubber goods, including tires, and automobiles, for 1916 show a marked increase over those for the previous year, the totals for the first-named articles being \$8,660 against \$849; while the figures for automobiles and their parts were \$9,586 in 1916 and \$7,852 in 1915.

The United States share in this trade was:

	1915.	1916.
Rubber goods and tires	\$260	\$1,709
Automobiles and parts	5,838	8,301
Totals	\$6,098	\$10,010

HOLLAND

The rubber exports from Amsterdam to the United States during the past four years were \$382,430 in 1913, \$534,805 in 1914, \$98,960 in 1915, and \$164,689 during 1916. Automobile imports into Holland from this country during 1916 are said to have been the highest on record.

LONDON.

The exports of rubber from London to the United States during the six months ending June 30, 1917, amounted to \$34,611,850. For the same period in 1916 the value was \$24,556,033.

NEW ZEALAND.

The following table gives the imports of rubber footwear for the years 1914, 1915, and 1916 by country of origin, number of dozen pairs, and value:

	1914.		1915.		1916.	
	Dozen pairs.	Value.	Dozen pairs.	Value.	Dozen pairs.	Value.
Galoshes and overshoes of rubber, gymnasium shoes, etc:						
United Kingdom	24,167	\$86,624	24,729	\$86,667	21,492	\$88,809
Canada	3,160	22,746	2,690	17,695	3,069	19,408
France	216	516	30	228	.....	.....
Sweden	71	326	283	1,120	113	389
Japan	18	29	116	418	736	2,151
United States	2,850	17,807	2,406	15,014	1,546	9,426
All other countries	100	418	10	39	80	146
Totals	30,582	\$128,466	30,264	\$121,181	27,036	\$120,329
Gum boots:						
United Kingdom	223	\$11,247	100	\$5,270	56	\$3,582
Canada	360	11,688	309	8,755	285	8,730
Australia	14	743	24	1,732	3	200
United States	1,272	48,945	1,286	45,550	1,029	38,947
All other countries .....	.....	19	.....	.....	.....	.....
Totals	1,869	\$72,642	1,719	\$61,307	1,373	\$51,459

SPAIN.

A great demand exists in the Barcelona district for rubber heels and soles, about 10 tons having been imported during 1916. The sizes of such heels which are in greatest demand for women's shoes are those of medium dimensions, adapted to the Cuban heel. The whole heel for men's shoes is not generally used, its place being taken by the half heel, all sizes of which have an excellent sale. Rubber soles are difficult to obtain at present, but could be disposed of readily if more widely distributed. These articles pay a duty of \$0.32 per pound.

THE SITUATION IN RUSSIA.

By a Special Correspondent.

THE war and the revolution are working changes in the Russian peasant's conception of comfort and luxury and of what degree of each ought to fall to his share, that are as important—if less apparent—as his new attitude towards politics. He has been taken out of his tiny village, brought to large towns, made to work in factories, and, in any case, he now receives more money than he ever dreamt of possessing. He has learned that there are comforts, hygienic and sanitary, and is no longer satisfied with his village or town, where there are no tramways, lighting-systems, baths, etc. And his demand for all these and other things is going to cause the establishment of numerous factories and the placing of vastly increased foreign orders. Russia sees her backwardness and is striving mightily to advance. Conscious of her need of direction in this great effort, she turns to America for help with the cry voiced by one of her able men:

Teach us the a-b-c's of sane and wholesome work, make us efficient in our efforts, show us the results of well applied labors, and above all help us to erase that ancient self-verdict of the Russians which says: "Our land is vast and fruitful but there is no order in it."

America's growing interest in Russia is well known, and lately a circular was addressed to the different government departments in Russia to ascertain their attitude concerning the question of

the investment of foreign capital, and particularly American capital, in Russian enterprises. Furthermore, the Russian-American Chamber of Commerce is sending Professor B. E. Shatzky on a mission to the United States, to open a general information bureau for the distribution of data in connection with economic conditions in Russia.

It is interesting to learn that America's exports to Russia for 1916 were practically six times as great as in 1914, and nearly five times those of 1915.

Among the exports for 1916 may be noted.

Rubber belting, hose, etc.....	\$4,845
Automobile tires	1,125,733
Other tires	28,313
Miscellaneous rubber manufactures.....	20,416
Insulated wire and cables.....	13,915
Fountain pens	2,058
Total	\$1,195,280

The value of all kinds of motor vehicles imported from America was \$18,749,186. This includes airplanes, commercial and passenger automobiles and parts (except tires and engines) and motorcycles. The amounts for 1914 and 1915 were \$1,058,938 and \$9,456,089, respectively. The business in rubber manufactures during the same years was \$22,891 and \$12,616.

Russia also buys large quantities of cotton, Upland (including linters) and Sea Island. In 1916 the figures for Upland cotton and linters were 86,724,722 pounds, valued at \$10,125,462, and in 1915 41,062,654 pounds, valued at \$4,218,116.

THE DEMAND FOR CRUDE RUBBER.

The shortage of rubber is keenly felt in Russia and the demand is increasing continually. Negotiations, however, are hampered owing not only to shipping difficulties and freights, but also to the very great difference in exchange. Russia has always been a large consumer of rubber; before 1914 she imported 9,000 tons of raw rubber and gutta percha, and despite the war with its attending obstacles to trade, the imports were not diminished; in fact, they were increased in the case of rubber manufactures. And it is not likely that peace will lessen the demand for either the crude or manufactured article.

THE SITUATION IN MALAYA.

By a Special Correspondent.

RUBBER PRODUCTION.

THE total amount of rubber produced in the Malay Peninsula in 1916 falls just short of running into six figures, a development amazing in its rapidity, as is well illustrated by the following table:

Year.	Production in Malay Peninsula. Tons.	Year.	Production in Malay Peninsula. Tons.
1916.....	99,063	1910.....	6,504
1915.....	70,214	1909.....	3,340
1914.....	47,006	1908.....	1,629
1913.....	33,641	1907.....	885
1912.....	20,320	1906.....	430
1911.....	10,782		

This total output is derived from the following parts of the Peninsula:

	Production.		
	1914.	1915.	1916.
Selangor	14,015	19,120	26,163
Perak	11,042	16,663	23,421
Johore	5,358	9,167	14,004
Malacca	6,766	11,022	12,388
Neer Sembilan	5,278	8,177	12,179
Penang and Province Wellesley..	2,425	2,643	4,935
Kedah	1,030	1,889	3,314
Kelantan	307	536	1,010
Pahang	362	564	1,001
Singapore	423	433	628
Trengganu .....	.....	.....	20
Totals	47,006	70,214	99,063

The rapid increase of Johore rubber is striking. Another fact is that to-day's production of Singapore island alone exceeds that of the total Peninsula eleven years ago, and that Selangor and

Negri Sembilan together produce to-day more rubber than the whole of South America put together!

The total exports from Singapore in 1916 were 48,650 tons; in 1915 the amount was 38,283 tons, of which 12,824 tons went to Great Britain, 1,998 tons to European countries, 1,230 tons to Japan, and 21,075 tons to the United States. Exports from the Federated Malay States now constitute about half the world's output and were 62,763 tons in 1916 as compared with 44,524 tons in 1915.

The increase in direct sales to America is best illustrated by the following:

	1913.	1914.	1915.
Direct shipments tons	2,508	4,510	21,075

ACREAGE UNDER RUBBER.

Government figures available refer to estates over 100 acres in extent and show a grand total at the end of 1915 of 833,069 acres planted in rubber with a reserve of 917,185 acres.

Further grants of land have been made during the year, but the government of the Federated Malay States has since decided to discontinue the issue of land grants of more than 50 acres in extent, pending the return of labor, capital and administrative conditions to normal.

POSSIBLE RESTRICTION OF EXPORTS.

The prohibition of rubber exports from Ceylon is regarded with anxiety here, and it is feared that a similar prohibition will be applied to Malaya. There is a rumor that the exports to the United Kingdom are to be reduced to 2,000 tons monthly. In view of this condition, schemes for limiting the output—alternate day tapping or complete abandonment throughout the country of Sunday tapping—have been suggested. There are authorities, however, who consider that the position would hardly be as serious as it sounds if more rubber could be shipped direct to the United States via the Pacific Ocean. It is pointed out in this connection that America has become the greatest consumer of rubber, and that of the large quantities entering the country only 22 per cent came from Great Britain. An interesting question is whether America will have to pay more or less for the rubber. To some, the former appears probable, since a demand is here concerned that must be satisfied, while others point to the possibility of operators in Singapore taking advantage of the situation created by the restriction of imports to depress the local market, and suggest that the authorities should fix a minimum price or take some other means to protect the planter.

RUBBER SEED OIL EXPERIMENTS.

Experiments are being made in the Federated Malay States regarding the commercial possibilities of rubber seed oil. The establishment of local crushing plants is being considered, the oil to be shipped to Great Britain and the cake used as cattle food or manure.

One of the chief difficulties in establishing a local crushing industry is the fact that the crop season for rubber seed lasts only about two months. Tests are therefore being made to discover whether rubber seed can be preserved for any length of time.

THE F. M. S. AGRICULTURAL CONFERENCE.

AT the Federated Malay States Agricultural Conference, held at Kuala Lumpur late in April, several interesting papers on various departments of plantation practice were read by T. J. Cumming, E. W. King, W. R. Shelton Agar, R. M. Richards, W. N. C. Belgrave, A. P. Vesterdal, F. G. Spring and others. Further facts were developed by the discussion in which many planters participated.

RUBBER CULTIVATION AND DISEASES.

It was stated that before attempting manuring in the case of poor areas, working of the soil should be tried, especially with

plough and harrows. A loose topsoil was of vital importance and rubber trees responded very well to proper treatment in respect to cultivation. Tillage in circular plots around the trees was recommended in the case of previously planted areas, the best time for this being the wet season, as the abundant moisture could then be conserved for the dry season.

Experiments in manuring showed that lines did more harm than good. Kainit seemed to have no effect. The best result was obtained on blocks receiving bonemeal at the rate of 400 pounds to the acre; but the effect of the same quantity of superphosphate was not far behind. Satisfactory results were also obtained with basic slag.

In connection with thinning-out, pollarding was not recommended. Pollards yielded little latex, led to careless tapping and prevented adjacent trees from benefiting fully. The most satisfactory way was to cut out the tree about two feet below ground level, removing as many side roots as possible without interfering with adjacent trees. As to the method of thinning-out, it was held that with 20 by 20 planting, as a general rule, as soon as 90 per cent of the trees were tappable, the rest might be dispensed with right away. After that, as soon as the natural development of trees showed signs of being checked the number per acre should be reduced.

The usefulness of clean-clearing to prevent the spread of diseases was also emphasized. The best way of getting rid of timber was by "double felling," that was, to allow clearings to grow up again for a year after the first felling and then refell and burn off. To prevent the spread of diseases, trenching deep enough to sever lateral roots and wide enough to include all affected roots, was recommended. The best time for clean clearing was before planting, but as the expense of this was very great, smaller stumps and roots could be taken up, while the large stumps could be trenched.

VARIABILITY OF PLANTATION RUBBER.

B. J. Eaton read an important paper on "Preparation of Plantation Para Rubber With Special Reference to Future Considerations." The researches of the F. M. S. Agricultural Department, he said, showed that variable methods of preparation were responsible for variability of the product. According to him, the uniformity of fine hard Para was due to the length of time taken in preparation, averaging any variations in conditions. He pointed out that market demands made it impossible for estates to produce one uniform type of rubber, so uniformity could apply strictly to only one type of rubber. For the present at least, three or four grades must be made, including two first grades—Pale crêpe and No. 1 lower grade crêpe—consisting of lump, skimmings and picked scrap—and No. 2 lower grade crêpe of bar shavings and earth scrap.

In discussing the better grades, he considered the problem of continuing the production of Pale crêpe and Smoked sheet, or of substituting the so-called "Slab" rubber for Smoked sheet. His conclusions are given in detail on page 716 of this issue.

RUBBER IN THE BRITISH COLONIES.

Rubber as a crop in India is growing in prominence, especially in Burma and Madras. The exports of raw rubber from India in the year 1916 were 6,229,242 pounds, valued at £970,916, as compared with 4,840,640 pounds, valued at £756,994, in 1915. Of the exports in 1916, 3,847,125 pounds, valued at £643,718, were shipped to the United Kingdom.

The total value of rubber exported from Uganda during 1916 was £5,374 as against £3,159 in 1915. The crop suffers little from pests or diseases and promises to become of importance. In 1915-16 only 5,538 pounds of wild rubber were exported.

The export of rubber from Zanzibar is mainly derived from *Landolphia kirkii*, of which a considerable quantity grows wild in a forest in Pemba. 2,384 pounds, valued at £213, were exported in 1915. The cultivation of Ceara, which was taken up

continued.

until it is now a negligible quantity. Cultivated rubber, on the other hand, is shown to be on the increase, 6,766 acres being under cultivation in 1915-16, as compared with 5,936 in the previous year. Exports of cultivated rubber from Nyasaland in 1915-16 were 46,002 pounds, valued at £3,801, as compared with 33,685 pounds in the previous year.

In Seychelles there are about 184,000 rubber trees planted out, and about half of this number have reached the tappable size.

The value of the exports of rubber from Nigeria in 1915 was £38,113, as compared with £38,854 in 1914. On two Para rubber estates in the Sapele district, 94,413 pounds of rubber were harvested.

From Ashanti 317 tons of rubber, valued at £20,135, were exported during 1915. The increase was due to a renewed demand in Europe, caused by the exceptional conditions prevailing. When these conditions cease this trade may be expected to die down again. The natives have shown little interest in planting out Para seedlings. There are two European agricultural companies in the Southern Province of Ashanti, which have planted out large areas of cocoa and rubber. The oldest Para trees are six years old, and most of the trees are now tappable. The *Funtumia* trees are described as a failure, as they appear to need at least twenty years before yielding commercially.

Rubber has been planted on several estates in the wet districts of Vitilevu and Vanualevu in Fiji. The cultivation commenced about nine years ago, and subsequent growth has been satisfactory as compared with other countries. The plants now in Fiji have stood the occasional storms well. Rubber was exported from Fiji in 1915 to the value of £3,464, as against £463 in the previous year. It is hoped that the export of this produce will increase.

The leaf disease of rubber has again visited some plantations in British Guiana. It is considered that until a uniform period of wintering of the trees is obtained, considerable trouble in this respect must be expected.

RUBBER TRADE IN COCHIN CHINA.

Figures for the years 1913, 1914, 1915 show an increase in the quantity of rubber exports, but a decrease in the imports. This is mainly due to the fact that a great part of the French population, using manufactured articles, has returned to France on account of the war.

The exportation of wild rubber, which used to be sent along the Mekong river from the forests of Laos and Cambodja, is no longer of any importance. On the other hand, plantation rubber exports have increased rapidly in the last few years. In 1908, 3 tons were shipped from Saigon, while in 1915, 357 tons were exported. The amount for the period January 1, 1916, to August 22, 1916, was 312 tons, as against 133 tons for the same period in 1915. Since January, 1915, the exportation of rubber to countries other than France has been prohibited. Exports for the years 1913, 1914, 1915 were valued at \$128,752, \$158,328 and \$315,075, respectively.

The decrease in some imports is illustrated by the following:

	1913.	1914.	1915.
Rubber	\$185,681	\$197,234	\$188,000
Automobiles	412,800	202,212	152,004
Coffee	218,178	244,878	144,700

Sheet rubber is imported from France, and the value increased from \$11,000 to \$40,000. Rubber articles come from France and Singapore and advanced from \$23,000 to \$38,000, but the values for tires and hose decreased from \$142,000 to \$86,000. Automobile, riskshaw and cycle tires are imported chiefly from France and England.

BOLIVIAN NOTES.

BOLIVIA is one of those countries whose economical situation has been seriously affected by the war. It was, in fact, due only to her great mineral wealth that she was able to support the difficult position at all. However, it would appear from trade statistics for the first four months of 1916 that conditions were improving.

Another important item is the export of rubber, which underwent a marked increase in 1915. The United States is Bolivia's best customer for rubber, having bought no less than 90 per cent of the whole quantity exported. The distribution of the rubber exports in 1914 and 1915 was as follows:

	1914.		1915.	
	Metric tons.	Value.	Metric tons.	Value.
United States	419	\$311,701	4,645	.....
Great Britain	2,846	2,098,199	341	.....
France	575	425,800	68	.....
Germany	481	347,540	16	.....
Belgium	157	115,978	.....	.....
Chile	7	12,931	.....	.....
Argentina	.....	.....	9	.....
Spain	.....	.....	2	.....
Totals	4,485	\$3,312,149	5,081	.....

The total rubber exports in metric tons of 2,204.6 pounds, over a period of 10 years show a steady increase in production: 1906, 1,930; 1907, 1,831; 1908, 1,818; 1909, 3,052; 1910, 3,118; 1911, 3,646; 1912, 4,080; 1913, 5,143; 1914, 4,485; 1915, 5,081.

Among the 1915 imports from the United States may be noted: Automobiles, valued at 22,183 bolivianos (the normal value of a boliviano in United States currency is \$0.3893), and rubber manufactures amounting to 4,628 bolivianos. The total amounts for these two items were, 26,192 and 24,282 bolivianos respectively.

EXPORT TAXES ON RUBBER.

In accordance with the law of November 18, 1913, rubber exported from Bolivia is subjected to the following export taxes:

Article 1.—When the quotation for rubber is 25 to 36 pence the export tax shall be 2 per cent ad valorem. This tax shall be 4 per cent ad valorem when the quotation rises to 37 to 48 pence, and 6 per cent when the quotation is 49 pence or above.

Article 2.—The same rate of export taxes shall apply to rubber of inferior grades, with an allowance of 30 per cent off the quotation for fine rubber.

Article 3.—In cases where the export tax collected in custom-houses of foreign countries adjacent is lower than that imposed by Bolivia, the government shall have the right to lower the rate of the Bolivian tax. (This measure was adopted to prevent smuggling of the rubber across the border and the consequent loss of Bolivian revenues.)

Article 4.—For the purpose of this law the value of rubber exported from Bolivia shall be 70 per cent of the London quotations at the time of the exportation. The London quotations shall be certified to the Bolivian Government fortnightly by the Bolivian consul stationed in London.

The acquisition of rubber lands in Bolivia is subject to the law governing the public lands of Bolivia.

Bolivia has no sea coast, but the government is much interested in the development and extension of railway lines and has declared its intention to extend the La Paz-Yungas railway, thus securing an outlet to the Atlantic by way of the Amazon River and the Madeira-Mamore Railway. This is of special importance to rubber producers who will then have an easy connection with the railways that connect with the sea coast ports.

The President of Bolivia has been authorized to contract a loan of £1,000,000 for the construction of the Atocha-Tupiza line, the last link between La Paz and Buenos Aires, and the government is endeavoring to place this loan in the United States.

Recent Patents Relating to Rubber.

THE UNITED STATES.

ISSUED JULY 17, 1917.

- N**O. 1,233,401. Hose-coupling. J. H. Reeve, Sherman, Calif.
 1,233,420. Laminated, cohesive, interwound fabric constructed in tubular and annular form. L. A. Subers, East Cleveland, Ohio.
 1,233,465. Demountable rim. A. H. Harris, Berbereton, assignor to The Firestone Tire & Rubber Co., Akron—both in Ohio.
 1,233,478. Tire. I. B. Irons, Morgantown, W. Va.
 1,233,504. Shoe-heel. J. Plant, Douglas, Alaska.
 1,233,537. Massage device. J. E. Ahlman, Denver, Colo.
 1,233,660. Tire-rim tool. A. A. Friestedt, assignor to Friestedt Manufacturing Co.—both of Chicago, Ill.
 1,233,705. Wheel-rim. J. T. Ronald, Seattle, Wash.
 1,233,811. Menstrual bandage or catamenial sack. P. Roger, Milford, Mass.
 1,233,853. Pneumatic tire. J. Drummond, C. Spuhel, and F. Spuhel—all of Kansas City, Mo.
 1,234,004. Vehicle-tire. F. Funderburg, Huntington, Ind.
 1,234,075. Tire-armor. W. H. Opitz, Bedford, Ind.

ISSUED JULY 24, 1917.

- 1,234,118. Tire armor. M. V. Batcheller, Gowrie, Iowa.
 1,234,142. Pneumatic tire. F. S. Dickinson, New York City.
 1,234,143. Pneumatic tire. F. S. Dickinson, New York City.
 1,234,144. Self-healing inner tube. N. C. Doss, Rome, Ga.
 1,234,193. Detachable tread for pneumatic tires. A. G. Mass, assignor of one-half to J. W. Stapleton—both of Cincinnati, Ohio.
 1,234,289. Cushion wheel. A. Chelew, Toronto, Ontario, Canada.
 1,234,331. Demountable tread for tires. R. B. Hartman, Milwaukee, Wis.
 1,234,338. Hose nozzle. C. F. Hughes, Portland, Oregon.
 1,234,538. Antiskidding tire attachment for wheels. J. A. Granstrom, Everett, Mass.
 1,234,631. Operating tool for split tire rims. E. O. Collins, Chillicothe, Ohio.
 1,234,682. Vehicle tire. E. W. Mighell, Plano, Ill.

ISSUED JULY 31, 1917.

- 1,234,820. Demountable wheel rim. F. H. Summeril, Los Angeles, Calif., assignor, by mesne assignments, to Keystone Vehicle Parts Co., Inc., New York, N. Y., a corporation of New York.
 1,234,821. Rubber tire. J. A. Swinehart, St. Louis, Mo.
 1,234,940. Relief valve for pneumatic tires. H. L. Shaffer, Washington, Iowa.
 1,235,013. Rubber heel. M. Costa, East Wallingford, Conn.
 1,235,080. Tire tube protector. J. T. Tooloose, Platts, Mo.
 1,235,093. Wheel tire. T. E. Auvil, Baltimore, Md.
 1,235,095. Inflatable surgical packing. A. L. Beck, New Rochelle, N. Y., assignor to Ella C. Beck.
 1,235,142. Syringe. S. A. Ichilian, Washington, D. C.
 1,235,156. Armored tire. C. E. Peabody, Brooks, Me.
 1,235,169. Pacifier. G. V. Tallon, New Haven, Conn.
 1,235,308. Tire rim manipulator. A. A. Friestedt, assignor to Friestedt Manufacturing Co.—both of Chicago, Ill.
 1,235,360. Tire rim. S. P. Michael, Frankfort, Ind.
 1,235,401. Removable rim for tractor wheels. H. C. Waite, Chicago, Ill., assignor to Figin Tractor Corp., Elgin, Ill., a corporation of New York.
 1,235,421. Tire. S. T. Bottenfield, assignor to The Bottenfield Tire Co.—both of Cleveland, Ohio.
 1,235,458. Tire tread of sheet metal. M. E. Fox, R. L. Ryan, and C. M. Sawyer—all of Winston-Salem, N. C.
 1,235,485. Tire. I. N. Keim, Mount Holly, N. J.
 1,235,528. Automatic self healing inner tube for pneumatic tires. C. L. Crow, Alexander City, Ala.
 1,235,537. Vehicle wheel rim. R. S. Bryant, assignor to The Standard Welding Co.—both of Cleveland, Ohio.

ISSUED AUGUST 7, 1917.

- 1,235,547. Wheel rim and tire construction. H. Raffovich, New York City.
 1,235,621. Vehicle wheel with block rubber and metal tires. H. Weiner, New York City.
 1,235,669. Obstetrical cushion. A. C. Eggers, Brooklyn, N. Y., assignor to The Goodyear's India Rubber Glove Manufacturing Co., a corporation of Conn.
 1,235,670. Non-skid chain attachment for rubber tired wheels. W. H. Falls, Bridgeport, Conn.
 1,235,727. Tire deflation signal. W. W. Robinson, Portland, Me.
 1,235,753. Typewriter platen. N. H. Anderson, Middletown, assignor of one-half to W. A. Lorenz, Hartford—both of Conn.
 1,235,754. Typewriter platen. N. H. Anderson, Middletown, assignor of one-half to W. A. Lorenz, Hartford—both of Conn.
 1,235,755. Noiseless typewriter platen comprising a rubber cylinder on the outer core. N. H. Anderson, East Hampton, assignor of one-half to W. A. Lorenz, Hartford—both of Conn.
 1,235,756. Noiseless typewriter platen. N. H. Anderson, East Hampton, assignor of one-half to W. A. Lorenz, Hartford—both of Conn.

- 1,235,861. Rubber tire casing. H. N. Wayne, assignor to W. J. Ennis—both of Los Angeles, Calif.
 1,235,876. Hose connection for fabric and rubber hose. H. Cave, Elizabeth, assignor to Davis Bournonville Co., Jersey City—both of N. J.
 1,235,877. Tire casing. T. P. Chrisomalis, New York City.
 1,235,878. Hose comprising an outer casing and an inner tube of smaller diameter free to expand to the wall of the casing. W. T. Cole, Newton, Conn., assignor to Fabric Fire Hose Co., a corporation of Conn.
 1,235,890. Case for hypodermic syringes comprising a rubber collar for gripping the hypodermic needle head. A. J. Gilbert, Eufaula, Ala.
 1,235,921. Hose supporter button. R. Parker, assignor to Parker, Stearns & Co.—both of Brooklyn, N. Y.
 1,235,963. Anchoring means for the cord body fabric of tires of the "cord" type. F. S. Dickinson, New York City.
 1,235,965. Vehicle wheel tire. F. Fisher, assignor of one-fourth to A. C. Immer, one-fourth to F. L. Reichert, and one-fourth to W. Selinger—all of Arcadia, Mo.
 1,236,036. Teat cup. C. O. Anderson, Lancaster, Pa.
 1,236,174. Rubber heel. E. J. Hooper, Stoughton, Mass.
 1,236,227. Armored tire structure. C. W. Stewart, Martinsburg, W. Va.
 1,236,251. Non-skid device. P. Balko and A. Kocovsky, Milwaukee, Wis.
 1,236,290. Toy ball comprising a whistle and a rattle, etc. C. O. Griffin, Newbern, N. C.
 1,236,301. Vehicle wheel rim. E. N. Hatcher, East Tallassee, Ala.
 1,236,304. Hand stamp comprising an inflatable hollow sphere. R. L. Howell, Rochester, N. Y.
 1,236,310. Automatic life preserver. W. F. Johnson, Riverside, Calif.
 1,236,312. Hose clamp. H. C. Jones, Allentown, N. J.
 1,236,365. Life saving belt. H. B. Rogers, London, England.

ISSUED AUGUST 14, 1917.

- 1,236,411. Tire valve and signal. W. F. Downs, Bay Shore, N. Y.
 1,236,412. Cushion tired wheel. E. F. Dreman, Cleveland, Ohio.
 1,236,490. Cushion tire. R. D. Shirey, Woodland, Pa.
 1,236,506. Tire shoe or casing. G. S. Van Voorhis, Boston, Mass.
 1,236,534. Reinforced air tube for pneumatic tires. J. W. Blodgett, Chicago, Ill.
 1,236,619. Stopper for water bags, bottles, and the like. M. T. Steele, Brooklyn, N. Y.
 1,236,671. Non-skid device. H. Carroll, Boone, Iowa.
 1,236,689. Rain coat. M. C. Doubles, Richmond, Va.
 1,236,821. An improvement in wheel tires. W. T. Carey, Cranston, R. I.
 1,236,924. Arch supporter. M. Golden, Boston, Mass.
 1,237,041. Air valve for pneumatic tires for bicycles or the like. E. A. Hilding, Lidköping, Sweden.
 1,237,155. Rubber tire. M. E. Baxter, Steubenville, Ohio.

THE UNITED KINGDOM.

ISSUED JUNE 27, 1917.

- 105,894. Rubber-surfaced paving blocks. G. Anderson and Leyland & Birmingham Rubber Co., Leyland, near Preston.
 105,940. Gutta percha filled joint-making washers. C. J. Beaver, Range-moor, Crescent Road, Hale, and E. A. Claremont, Broom Cottage, High Legh—both in Cheshire.
 105,955. Reservoir pen. A. Coats, Hayfield, Castlehead, Paisley.
 105,961. Auxiliary pneumatic vehicle springs formed of short lengths similar to pneumatic tires. L. D. Jones, 134 Vine street, Bridgeport, Connecticut, U. S. A.
 105,977. Pneumatic cushions for air craft. T. Sloper, Southgate, Devizes, Wiltshire.

ISSUED JULY 4, 1917.

- 106,038. Infants' soother. Hasting, Lang & Co. and H. W. Byrom, 1 Roman street, Church street, Manchester.
 106,068. Tourniquet comprising a rubber tube. J. T. Brierley, "Highfield," and Leyland & Birmingham Rubber Co., Golden Hill Works—both in Leyland, Lancashire.
 106,126. Wheel tire rims. F. W. Baker, 59 Hagley Road, and J. S. Foley, 17 Beale street—both in Stourbridge.
 106,134. Golf ball. W. Taylor, "Southlea," Elms Road, Knighton, Leicester.
 106,157. Anti-rattlers for doors, etc., consisting of studs of resilient material forced through countersunk holes in plates. Daimler Co. and A. E. Berriman, Daimler Works, Coventry.
 106,198. Sock suspender. A. J. Lister, Marlborough House, Clifton Road, Ilkley, Yorkshire.

ISSUED JULY 11, 1917.

- 106,278. Inhaling device. Dragerwerk, H. & B. Drager, 53 Moislinger Allee Lubeck, Germany.
 106,295. Rubber mud-shield for boot heels. A. E. MacDonald, "Pegli," St. John's Road, Golder's Green, London.
 106,321. Rubber-faced motorcycle driving belt. G. Warwick, 80 Cobham Road, Seven Kings, Essex, and A. P. Crouch, 106 Cannon street, London.

ISSUED JULY 18, 1917.

- 106,402. Valves. C. A. Iorns, 4750 Cook avenue, St. Louis, Missouri, U. S. A.
 106,476. Method of coupling fabric hose sections. N. B. Braley, 14 West Granite street, Butte, Montana, U. S. A.

- 96,382. A white bar between two blue bars all of equal width—gaskets, lamp connections, automobile bumpers, pump valves, spiral packings, sheet packings, piston packings, rubber belting, rubber hose reinforced with fabric, air brake hose, pipe tester rings, fuller balls, siphon valve washers, tank balls, rubber elbows, rubber washers, jar rings, tire relines, blow-out patches, inner tube patches, tire inner tubes and ties. United States Rubber Co., New Brunswick, N. J., and New York City.
- 96,418. A white bar between two blue bars all of equal width—rubber boots, rubber and fabric boots, boots and shoes having fabric uppers and composition soles, rubber coats, overalls, leggings, hats, gloves, mittens, swimming vests, aprons, heels and soles. United States Rubber Co., New Brunswick, N. J., and New York City.
- 96,994. Representation of a gloved hand holding an instrument within a pneumatic tire—rubber tires and tubes. The Miller Rubber Co., Akron, Ohio.
- 98,187. The white letters G. B. Co. on a black diamond-shaped background—chewing gum. George Brothers Co., Manitowoc, Wisconsin.
- 98,392. The words EST'D S. S. 1880 within a wreath and beside it the word KOMFORT—shoes made of leather, rubber, canvas or any combination of the three. Albert J. Schmidt, Pittsburgh, Pennsylvania.
- 99,420. The word McELWAIN—boots and shoes with rubber soles or heels. W. H. McElwain Co., Boston, Mass.
- 99,576.—The word MUTUAL within a white diamond with a black border—tires, tubes and mechanical rubber goods. The Mutual Motor Stores Co., Cleveland, Ohio.
- 100,219. The word MUTUAL within a diamond-shaped design—rubber cement and tire tape. The Mutual Motor Stores Co., Cleveland, Ohio.
- 102,401. Representation of a shield—clothing including rubber shoes. J. Bacon & Sons, Louisville, Ky.
- 102,897. The word REPUTATION—druggists' sundries. United Drug Co., Boston, Mass.
- 102,898. The word FIRSTAID—druggists' sundries. United Drug Co., Boston, Mass.
- 102,993. Representation of an outdoor scene showing repair being made to an auto tire above which is the compound word AUTO-SEAL and a bird holding a can of the material—a compound for closing holes or punctures in pneumatic tires. National Chemical Co., Clinton, Iowa.
- 103,713. The word JIFFY—cementless patches for mending pneumatic inner tubes for tires and like inflated articles.
- 103,720. The word AIR-IN—raincoats. Kling Bros. & Co., Chicago, Ill.
- 104,004. The word TOESAN—composition shoes and rubber overshoes. Batterman Rubber Co., Boston, Mass.
- 104,543. Representation of a soldier and the compound word Soldier-Boy within an oval—rubber boots and shoes. The Beacon Falls Rubber Shoe Co., Beacon Falls, Conn.
- 104,557. The word ANGLE—rubber tires, casings, and tubes. The Marathon Tire & Rubber Co., Cuyahoga Falls, Ohio.
- 104,558. The word ANGLE—rubber and composition soles and heels. The Marathon Tire & Rubber Co., Cuyahoga Falls, Ohio.
- 104,559. The word RUNNER—rubber tires, casings, and tubes. The Marathon Tire & Rubber Co., Cuyahoga Falls, Ohio.
- 104,560. The word RUNNER—rubber and composition soles and heels. The Marathon Tire & Rubber Co., Cuyahoga Falls, Ohio.

PATENTS ISSUED (WITH DATES OF APPLICATION).

- 482,932 (September 20, 1916). Improvements in the manufacture of hard rubber receivers and similar articles. W. W. Weiting.
- 482,960 (September 23, 1916). Protective pneumatic tire for carriage wheels. U. Favretti.
- 482,963 (September 25, 1916). Improvements in pneumatic tires. J. H. Christian.
- 482,994 (September 26, 1916). Device for inflating life-belts. W. G. Brokan.
- 482,995 (September 26, 1916). Improvements in wheels and rims. F. A. Scott.
- 483,006 (September 27, 1916). Capsule for compressed or liquid gas serving to inflate life-belts and pneumatic tires, as well as for other purposes. W. G. Brokan.
- 483,059 (September 29, 1916). Crutches for the wounded. G. A. Valland.

THE UNITED STATES.

- 92,308. The words *MM. LEBLANC* sanitary clothing. A. Stein & Co., Chicago, Ill.
- 92,614. The word *Ecco*—rubber-covered electrical wires and cables. The Electric Cable Co., Bridgeport, Conn.
- 94,368. The word *Bootskin* rain coats made of textiles treated with waterproofing materials. American Rubber Co., Boston, Mass.
- 96,373. A white bar between two blue bars all of equal width—drug sundries. United States Rubber Co., New Brunswick, N. J., and New York City.
- 96,374. A white bar between two blue bars all of equal width—rubber cement. United States Rubber Co., New Brunswick, N. J., and New York City.
- 96,375. A white bar between two blue bars all of equal width—rubber horseshoes and horseshoe pads. United States Rubber Co., New Brunswick, N. J., and New York City.
- 96,376. A white bar between two blue bars all of equal width—pneumatic pillows. United States Rubber Co., New Brunswick, N. J., and New York City.
- 96,377. A white bar between two blue bars all of equal width—rubber pails and hat bags. United States Rubber Co., New Brunswick, N. J., and New York City.
- 96,379. A white bar between two blue bars all of equal width—insulated wire and friction tape. United States Rubber Co., New Brunswick, N. J., and New York City.
- 96,380. A white bar between two blue bars all of equal width—powdered soapstone. United States Rubber Co., New Brunswick, N. J., and New York City.
- 96,381. A white bar between two blue bars all of equal width—furnace-bulbs, basin plugs, force cups, horn bulbs, plant sprinklers, and bath sprays. United States Rubber Co., New Brunswick, N. J., and New York City.

- 377,264. The word **DIVIDATAN** within a design—condenser rubber leathers, etc. E. Handley, Leventhorp Leather Works, Loco Mill Lane, Bradford, Yorkshire.
- 377,327. Representation of a moose's head above the words **THE MERCHANTS RUBBER CO., LTD.**—footwear made of rubber or partly of rubber. The Merchants Rubber Co., Ltd., Kitchener, Province of Ontario, Canada.
- 377,329. A representation of Jacques Cartier in an oval around which appears the name of the company—footwear made of rubber or partly of rubber. The Canadian Rubber Co. of Montreal, Ltd., corner of Notre Dame street East and Papineau avenue, Montreal, Canada.
- 377,615. The word **NAVITE**—electric insulating material or preparations made mainly of india rubber. Alfred Graham & Co., St. Andrew's Works, Crofton Park, London, S. E.
- 375,705. The word **GOULAG**—filler for india rubber compositions. American Gum Products Co., 200 Fifth avenue, New York, U. S. A.
- 377,911. The word **ROLVA**—waterproofing compounds. The Viva Co., 112, Moss Lane East, Manchester.
- 377,964. The word **GEM** above a design with the words **NORTH BRITISH RUBBER CO., LIMITED**, Edinburgh, encircling a representation of a sword and scales—hair combs. The North British Rubber Co., Limited, Castle Mills, Fountainbridge, Edinburgh, Scotland.
- 378,142. Representation of a deer within a circular design above which are the words **OKAPI BRAND**—packing and hose of all kinds. Hamel & Horley, Limited, London House, 35, Crutched Friars, London, E. C. 3.

THE DOMINION OF CANADA.

- 22,475. The word ACORN and the representation of an acorn at each end of the word—rubber tires. Acme Tire & Rubber Co., Limited, Toronto.
- 22,476. Representation of an automobile tire with an oak tree in the center and the words ROYAL OAK TIRES—rubber tires. Acme Tire & Rubber Co., Limited, Toronto.
- 22,514. The word THERMOID—brake linings and packing. Thermoid Rubber Co., Hamilton Township (Trenton), Mercer County, New Jersey, U. S. A.

DESIGN.

THE UNITED STATES.

- 51,036. Toy balloon. Term 7 years. Patented May 15, 1917. J. B. Amherst, Los Angeles, Calif.

Review of the Crude Rubber Market.

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NEW YORK.

AUGUST is usually a quiet period in the crude rubber market and the month just passed has been no exception to the general rule. The large buyers have shown no interest whatever in the spot market and futures being firmly held at a premium above spot prices were therefore not attractive. A year ago in August the market reached its lowest level, with First latex spot at 56½ cents, and futures covering the ensuing year were freely sold at 55 cents and even less. The upward swing that commenced in September last carried both First latex spot and futures to 84 cents on December 7, 1916, when the market declined. The experience gained by the sellers of futures at the low values of a year ago doubtless explains the negative attitude of the producers at the present time.

Plantations have interested smaller manufacturers who have taken advantage of the comparatively cheap nearby rubber and bought freely during the month. Inquiries have been numerous for all positions up to the end of next year, but sellers refused to make concessions and prices have ruled firm with a tendency to advance. Spot prices are about 1 cent to 1½ cents lower than a month ago, First latex being quoted 65½ cents and Smoked sheet ribbed 64½ cents on August 28, with futures nominally 67 cents for Latex and 65½ cents for Ribs. Brazilian Paras have been firm and practically unchanged with the exception of Upriver fine that was forced to 70½ cents during the month. Stocks of Caucho ball are plentiful and cheap, but the demand has been small. Africans were practically neglected, with the interest centered on Accra flake and Rio Nunez ball, the latter selling at the unusual price of 65 cents. Centrals continue to be scarce at firm prices.

The boggy of overproduction is dispelled by E. L. Killick, a well-known English authority, who sums it up as follows: "According to Rickinson, the world's production of rubber during the past three years was under:

	Plantation.	Brazil.	Rest.	Totals.
1914	71,381	37,000	12,000	120,381
1915	107,867	37,220	13,615	158,702
1916	152,650	36,500	12,448	201,598

"For 1917 the same authority gives the following estimate:

	Plantation.	Brazil.	Rest.	Totals.
1917	192,000	37,000	13,000	242,000

"It will be seen that plantation rubber increased about 50 per cent in 1915 and 1916, while the increase in 1917 may be only 25 per cent. After this year the rate of increase will rapidly decline as the diminishing area of rubber comes into bearing and by 1921 the increase may be almost negligible. In the light of such greatly increased consumption it is significant that the average price of plantation rubber should have risen from 2s. 6d. in 1915 to 2s. 10¼d. in 1916, while for the expired portion of the current year the average is over 3s. The lesson of these figures is that during two years of enormously increased production there has been corresponding expansion of the world's consumption, and it is clear that if the demand continues to increase at the same rate there is likely to be, a few years hence, not a surplus but an actual shortage of rubber."

In view of the foregoing, the following official figures of United States crude rubber imports are interesting: For the fiscal year ended June 30, 1917, the United States imported 333,373,711 pounds of crude rubber, compared to 267,775,557 pounds in 1916, and 172,068,428 pounds in 1915.

LONDON.

The London market has lacked inspiration from American buyers and quiet conditions have prevailed with firm prices

that show little change during the month. On August 1, Standard crêpe spot was 29¼d. and Smoked sheet 29d. The same grades were quoted 31d. and 29¼d. on August 28. The sentiment is strong against selling futures, spot and nearby being the only positions that are really considered in this market at the present time. London and Liverpool imports for June were 7,390 tons compared with 6,700 tons for May. Reexports for June were 4,750 tons, against 6,093 tons for May.

SINGAPORE.

During the first part of August the market developed a firm tone, despite the rather dull sentiment that prevailed. A tendency to decline was noticed after the second week and the market eased off, closing with lower prices. At the auctions held July 27, August 3, 11, 18 and 24, the average prices realized were: First latex crêpe 53.8 cents, compared to 56.09 cents last month; Smoked sheet ribbed 53.88 cents, compared to 55.14 cents a month ago. The total amount sold was 2,335 tons against 1,628 for last month.

NEW YORK SPOT QUOTATIONS.

	Sept. 1, 1916.	Aug. 1, 1917.	Aug. 28, 1917.
PLANTATION PARAS—			
First latex crêpe	56½ @	67 @	66 @
*Hevea first crêpe	54½ @	65 @	63 @
Amber crêpe No. 1, gristly blanket	54½ @	64 @	62 @
Amber crêpe No. 3	54½ @	63 @	61 @
Amber crêpe No. 4	52 @	62 @	60 @
Amber crêpe No. 5	52 @	62 @	59 @
Brown crêpe, thin sheet	52 @	61 @	58 @
Brown crêpe, thin sheet	52 @	61 @	58 @
Brown crêpe, thin specky	52 @	61 @	58 @
Brown crêpe, rolled	52 @	61 @	58 @
Smoked sheet, ribbed standard quality	56 @	67 @	65 @
*Hevea ribbed smoked sheets	56 @	67 @	65 @
Smoked sheet, plain standard quality	56 @	67 @	65 @
*Hevea plain or smooth smoked sheets	56 @	67 @	65 @
Unsmoked sheet, standard quality	56 @	67 @	65 @
*Hevea unsmoked sheets	56 @	67 @	65 @
Colombo scrap, No. 1	56 @	67 @	65 @
Colombo scrap, No. 2	56 @	67 @	65 @
BRAZILIAN PARAS—			
Upriver fine	68 @	69 @	68 @
Upriver medium	68 @	69 @	68 @
Upriver coarse	42½ @	48 @	48 @
Upriver weak fine	42½ @	59 @	59 @
Upriver caucho ball	42½ @	42½ @	40 @
Islands fine	60 @	61 @	61 @
Islands medium	28 @	58 @	58 @
Islands coarse	28 @	30 @	29½ @
Islands weak fine	33 @	55 @	55 @
Cameta	33 @	32½ @	32 @
Lower caucho ball	36 @	39 @	37 @
Peruvian fine	66 @	66 @	65 @
Tapajos fine	66 @	66 @	66 @
Tapajos caucho ball	66 @	39½ @	38½ @
AFRICANS—			
Accra flake	35 @	@	30 @
Niger flake	35 @	@	30 @
Benguella, extra seconds, 28%	38 @	39 @	39 @
Benguella, No. 1, 32½%	38 @	37½ @	38 @
Congo prime, black upper	@	56 @	55 @
Congo prime, red upper	@	53 @	53 @
Rio Nunez ball	@	64 @	65 @
Rio Nunez sheets and strings	@	64 @	65 @
Conakry niggers	@	@	65 @
Massai sheets and strings	@	@	65 @
CENTRALS—			
Central scrap	@	42 @	43 @
Central scrap and strip	@	41 @	41 @
Central wet sheet	@	31 @	30 @
Corinto	39 @	43 @	42 @
Esmeralda sausage	39 @	43 @	42 @
Guayule	32 @	33 @	32 @
MANICOBAS—			
Ceara negro heads	@	44 @	48 @
Ceara scrap	@	27 @	28 @
Manicoba special	42½ @	45 @	45 @
Manicoba extra	@	40½ @	42 @
Manicoba regular	@	37½ @	40 @
Mangabeira thin sheet	37½ @	39 @	39 @
Mangabeira thick sheet	@	35 @	35 @

* Rubber Association of America nomenclature.

	Aug. 1. 1917.	Aug. 28. 1917.
Latex 1st class	58 @ 64	68 @
Latex 2nd class	85 @ 92	78 @
Latex 3rd class		
Latex 4th class		
Latex 5th class		
Latex 6th class		
Latex 7th class		
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Latex 93rd class		
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Latex 97th class		
Latex 98th class		
Latex 99th class		
Latex 100th class		

COMPARATIVE NEW YORK PRICES FOR AUGUST.

In regard to the financial situation, Albert B. Beers (broker in crude rubber and commercial paper, No. 68 William street, New York) advises as follows:

"The market for commercial paper has continued about the same through August as in July, the demand being spasmodic though rather better, and rates on the best rubber names 5@5½ per cent, and those not so well known 6@6½ per cent."

	1917.	1916.	1915.
Upriver, fine	\$0.69 @ .70	\$0.65 @ .68	\$0.56 @ .59
Upriver, coarse	.47 @ .48	.39 @ .40	.42 @ .44
Islands, fine	.62 @ .68	.57 @ .59	.50 @ .52
Islands, coarse	.49 @ .50	.47 @ .48	.42 @ .48
Cametá	.31 @ .33	.32 @ .33	.29 @ .31

*Figured only to August 25.

MARKET CABLE SERVICE FROM SINGAPORE.

The following reports of the weekly auctions held at Singapore have been cabled by The Waterhouse Co., Limited:

Date.	Crêpe.	Smoked Sheet.	Tons Sold.	Market.
July 27...cents	55.67	55.25	626	Firmer
Aug. 3.....	55.25	55.67	470	Firm, but not advanced.
Aug. 11.....	53.55	54.40	328	Dull and declining.
Aug. 18.....	49.85	52.27	406	Opened and closed weak.
Aug. 24.....	52.70	51.85	505	Opened and closed weak.

MARKET CABLE SERVICE FROM LONDON.

The following market report has been cabled from London:

	Standard Crêpe.	Smoked sheets Rubber.	Market.
July 30.....	30d	29½d	Unsettled.
August 6.....	30d	29½d	Dull.
August 13.....	29½d	28½d	Nominal prices.
August 20.....	29½d	28½d	Irregular.
August 27.....	31½d	29½d	Quiet.

WEEKLY RUBBER REPORT.

GUTHRIE & CO., LIMITED, Singapore, report [July 19, 1917]:

The weekly rubber auction opened yesterday with rather a poor demand, there being very few buyers in the market, and prices for the leading grades show a slight decline as compared with last week. The top price for fine pale crêpe was \$1 down at \$132 (paid for one lot only) and that for ribbed smoked sheet \$3 down at \$128. Of plain sheet, smoked and unsmoked, there was again very little on offer, and only a few lots were sold. For brown and dark crêpes there was not much inquiry, and prices show a drop averaging about \$5 per picul. The quantity sold was 441 tons, out of a total of 742 tons cataloged.

The following was the course of values:

	In Singapore per Picul.*	Sterling Equivalent per Pound in London.	Equivalent per Pound in Cents.
Sheet, fine ribbed smoked....	\$122@128	2/ 6½ @ 2/ 7½	51.85@54.30
Sheet, good ribbed smoked....	112@121	2/ 4 @ 2/ 5½	47.60@51.43
Sheet, plain smoked.....	104@117	2/ 2½ @ 2/ 5½	44.20@49.73
Sheet, ribbed unsmoked.....	113@115	2/ 4½ @ 2/ 4½	48.03@48.88
Sheet, plain unsmoked.....	112@....	2/ 4 @	47.60@....
Crêpe, fine pale.....	128@132	2/ 7½ @ 2/ 8½	54.40@56.10
Crêpe, good pale.....	116@125	2/ 4½ @ 2/ 5½	49.30@53.12
Crêpe, fine brown.....	110@115	2/ 3½ @ 2/ 4½	46.75@48.88
Crêpe, good brown.....	106@108	1/ 11½ @ 2/ 3½	38.65@45.90
Crêpe, dark brown.....	75@100	1/ 8½ @ 2/ 1½	31.88@42.93
Crêpe, dark.....	60@81	1/ 5½ @ 1/ 10½	25.51@34.43
Crêpe, bark.....	55@ 90	1/ 4 @ 1/ 11½	23.38@38.25
Scrap, virgin and pressed....	66@ 83	1/ 6½ @ 1/ 9½	28.05@35.28

* First 133½ pounds.

Quoted in S. S. dollars = 2/4 [56.7 cents].

EXPORTS OF INDIA RUBBER FROM MANAOS DURING JULY, 1917.*

NEW YORK.

EXPORTERS.	Fine.	Medium.	Coarse.	Caucho.	Totals.
Stowell & Co.	15,376	360	16,222	3,821	36,779
J. M. Jones	52,106	4,854	24,009	16,900	97,869
Tires Trenchard & Co.	40,000	2,579	19,763	2,145	64,709
General Rubber Co.	27,657	2,004	4,814	21,356	55,831
Cham & Co.	6,800	...	26,100	19,050	51,950
G. Franchini & Co.	36,877	821	10,706	502	48,906
Bata Indus.	...	...	2,760	39,750	42,510
Suarez Hermanos & Co., Ltd.	175	8	249	6,458	6,990
Adelbert H. Alden, Ltd.	5,312	298	660	...	6,270
Sundries	36,809	2,120	9,781	32,819	81,529
	221,434	14,044	115,064	142,801	493,343
Manaos	142,286	69,385	50,081	221,839	483,591
Totals	363,720	83,429	165,145	364,640	976,934

*No exports to Europe.

IMPORTS AND EXPORTS OF RUBBER AND GUTTA AT SINGAPORE.

IMPORTS.

May 25-31, 1917.

From—	Para Rubber.	Para Rubber for Treatment.	Borneo Rubber.	Gutta Percha.	Gutta Jelutong.
Malay Peninsula—					
Penang	544,000	743,733			
Port Swettenham	472,000	573,466			
Teluk Anson	262,033				
Muar	113,466				
Kelantan	86,533	9,600			
Port Dickson	44,933				
Malacca	17,866	111,866			
Rengat	12,266	7,600			
Kuantan	5,333				
S. Pandjang	1,333				
Totals	1,559,763	1,446,265			
Borneo—					
Bandjermassin	104,400			14,800	78,133
Pontianak	34,933			9,200	8,000
Labuan	20,666	19,066	533	1,333	4,400
Sandakan	11,466	7,333			
Sambas	11,200				
Passir	10,800				
Jesseltown	9,466				
Samtut	1,333		2,400		69,333
Singawang	1,333				
Kudat	266	4,933			
Totals	205,863	31,332	2,933	25,333	159,866
Sumatra					
Djambi	68,400				
Deli	23,066	233,600			
Siak	2,133				
Indragiri	1,066				
Totals	94,665	233,600			
Java—					
Batavia	30,933				
Sourabaya	17,733				
Samarang	4,800				
Totals	53,466				
Siam—					
Bangkok	666				
Burma—					
Mergui	6,800				
Other ports	48,533		9,733	266	152,000
Grand Totals	1,969,756	1,711,197	12,666	25,599	311,866

EXPORTS.

May 25-31, 1917.

To—	Para Rubber.	Para Rubber Trans-shipped.	Borneo Rubber.	Gutta Percha.	Gutta Jelutong.
NORTH AMERICA:					
United States—					
New York	183,866	37,900			
Akron	86,666				
Totals	264,532	37,900			
EUROPE:					
United Kingdom—					
England—					
Liverpool	515,066	101,066		34,133	22,400
London	120,266	309,600		2,133	
France (Marseilles)	195,466				
Totals	830,798	410,666		36,266	22,400
Grand Totals	1,095,330	448,566		36,266	22,400

IMPORTS.

June 1-28, 1917.*

From—	Para Rubber.	Para Rubber for Treatment.	Borneo Rubber.	Gutta Percha.	Gutta Jelutong.
Malay Peninsula—					
Port Swettenham	1,593,600				
Teluk Anson	778,200				
Muar	737,733				
Malacca	722,633	1,134,266			
Penang	561,866	133,466			
Port Dickson	158,266				1,200
Kelantan	154,400				
Kuantan	47,066				
Rengat	17,333	22,533			
S. Pandjang	3,466				
Trengganu	666				
Totals	4,775,229	1,290,265			1,200

June 1-28, 1917.*

From	Para Rubber	Para Rubber for Treatment	Borneo Rubber	Gutta Percha	Gutta Jelutong
Borneo					
Pontianak	201,866	11,333	2,666	62,666	32,933
Bandjermasin	23,666	28,533		84,933	34,666
Sibu	74,000		101	10,273	296,666
Sembas	47,066			1,066	15,733
Sarawak	38,333				216,266
Iabuan	36,000		5,066	1,733	35,333
Jesselton	20,266			1,066	15,733
Sandakan	13,866	12,000	533		
Kudat	9,333	12,766			
Passi	8,533				
Sinokawan	6,933				
Samarinda	6,801		5,600	1,866	
Total	459,662	64,632	14,265	163,603	647,330
Sumatra—					
Djambi	231,466			400	
Deli	106,133	24,933			
Palembang	64,133		533	1,066	104,133
Indragiri	6,566				4,800
Pengkalis	3,600				
Muntok	3,466				
Belawan	3,333	141,600			
Siak	2,933				
Asahan		28,400			
Totals	421,730	414,933	533	1,466	108,933
Java —					
Batavia	30,000				
Sourabaya	29,333				
Samarang	1,733				
Total	61,332				
Siam—					
Patani	1,466				
Bangkok	533				
Total	1,999				
Burma —					
Merqui	3,333				
Other ports	239,333	60,000	5,333	8,133	
Grand Totals	5,967,618	1,829,830	20,131	173,202	757,463

EXPORTS.

June 1-28, 1917.*

To—	Para Rubber	Para Rubber Trans-shipped	Borneo Rubber	Gutta Percha	Gutta Jelutong
NORTH AMERICA					
United States—					
New York	2,666,400	1,264,133		285,200	846,400
Alton	5,339,600	410,933			
Seattle	1,380,266	306,000		156,800	731,866
Boston	459,666				
San Francisco	96,533			44,800	2,124,533
Canada —					
Toronto	202,800				
Montreal	145,466				
Vancouver	29,066				
Totals	15,309,197	1,981,066		486,800	3,702,799
Europe—					
United Kingdom—					
England					
Liverpool	1,452,266			102,933	29,600
London	1,201,733	2,741,466		203,600	8,666
France (Marseilles)	178,466			22,400	
Italy (Genoa)	890,400				
Totals	3,714,799	2,741,466		328,933	38,266
Grand Totals	19,023,996	4,722,532		815,733	3,741,065

* Six days missing.

STRAITS SETTLEMENTS RUBBER EXPORTS.

The export of plantation rubber from Straits Settlements ports in the month of June, as officially reported by cablegram from Singapore, amounted to 8,775 tons. Of this total, 482 tons were transshipments from adjacent countries. Appended are the comparative statistics for three years:

	1915.	1916.	1917.
January	2,576	4,443	3,562
February	2,741	3,359	6,495
March	2,477	4,481	8,299
April	1,978	4,219	6,103
May	3,588	3,274	6,282
June	2,249	3,836	8,775
Totals	15,609	23,612	39,516

The above figures include transshipments from various places in the neighborhood of the Straits Settlements, such as Borneo, Java, Sumatra and the Malay States other than the Federated Malay States.

PLANTATION RUBBER FROM THE FAR EAST.

TOTAL EXPORTS FROM MALAYA.

(From January 1, 1917, to dates named, excluding all foreign transshipments. Reported by Barlow & Co., Singapore.)

To—	Singapore. May 31, 1917.	Malacca. May 31, 1917.	Penang. April 30, 1917.	Port Swettenham. June 21, 1917.	Totals.
United Kingdom	22,198,963	2,081,978	10,197,667	18,800,399	53,279,007
The Continent	7,418,522		47,067		7,465,589
Japan	1,719,511				1,719,511
Ceylon	15,334		223,732	538,064	914,130
U. S. A. and Canada	48,309,613		6,220,200	553,264	55,083,077
Australia	249,600				249,600
China (Hongkong)				47,052	47,052
Totals	80,048,543	2,081,978	16,688,666	19,938,779	118,757,966
Same period, 1916	51,915,487	2,251,734	10,879,900	10,439,711	75,486,832
Same period, 1915	28,800,301	3,864,357	8,230,797	14,671,501	55,566,956
Same period, 1914	15,195,659	1,772,527	5,398,000	13,959,414	36,325,600

PLANTATION RUBBER EXPORTS FROM JAVA.

To—	May 1916.	May 1917.	Five Months Ending May 1916.	May 1917.
HOLLAND				
Hevea (to order) pounds	185,920		215,040	
GREAT BRITAIN:				
Ficus			8,470	4,572
Hevea	64,960		2,432,640	2,172,800
Ceara			16,427	12,707
Castilloa			18,832	13,272
Totals	64,960		2,478,369	2,203,351
UNITED STATES:				
Ficus			32,087	2,578
Hevea	1,169,280	3,532,480	6,596,800	14,400,960
Ceara			11,114	185
Castilloa		4,083		11,143
Totals	1,169,280	3,536,563	6,640,001	14,414,866
SINGAPORE:				
Ficus	2,924	1,813	20,720	8,840
Hevea	358,400	282,480	1,771,840	1,516,480
Ceara	6,204	15,378	18,016	27,460
Castilloa		2,599	2,365	3,405
Totals	367,528	302,270	1,812,941	1,556,185
JAPAN:				
Hevea	2,240		51,520	
OTHER COUNTRIES:				
Ficus	1,120		2,792	
Hevea	96,320	4,480	161,280	20,160
Totals	97,440	4,480	164,072	20,160

EXPORTS OF CEYLON GROWN RUBBER.

(From January 1 to July 2, 1917. Compiled by the Ceylon Chamber of Commerce.)

To—	1917.	1916.
United Kingdom	14,770,643	9,670,162
France	1,591,595	854,320
Italy	387,535	
Russia	229,673	248,874
Western Australia		56
South Australia	27	
Victoria	198,353	336,016
New South Wales	84,829	82,579
United States	9,861,615	13,384,570
Canada and Newfoundland	239,694	2,240
India	131	678
Straits Settlements	28	
Japan	40,288	155,189
Totals	27,404,411	24,734,684

Same period, 1915, 20,037,627 pounds; same period 1914, 16,088,110. The export figures of rubber, given in the above table for 1914, include the imports re-exported. (These amount to 1,968,030—1,669,729 pounds from the Straits, and 286,686 pounds from India.) To arrive at the total quantity of Ceylon rubber exported for that year deduct these imports from the total exports. The figures for 1916 and 1917 are for Ceylon rubber only.

CRUDE RUBBER ARRIVALS AT THE PORT OF NEW YORK.

The following statistics are not complete, due to Government orders prohibiting access to the records.

(The figures indicate weight in Pounds.)

[The Figures indicate Weight in Pounds.]					Fine. Medium. Coarse. Caucho. Cameta. Totals.				
PARA.					Fine. Medium. Coarse. Caucho. Cameta. Totals.				
JULY 15.—By the <i>Tricolor</i> —Para.									
General Rubber Co.	29,100		11,200						40,300
JULY 21.—By the <i>Vindeggen</i> —Manaos.									
General Rubber Co.	116,500		2,240	116,500					235,240
Meyer & Brown.	59,600	67,500	6,300	64,400					197,800
H. A. Astlett & Co.	49,840	5,600	64,960	68,320					188,720
JULY 26.—By the <i>Gen. H. F. Hodges</i> —Mollendo.									
Muller, Schall & Co.	17,395		935						18,330
JULY 28.—By the <i>Tungus</i> —Para.									
W. R. Grace & Co.	8,600	750							9,350
Henderson & Korn	24,200		5,600	4,500					34,300
Meyer & Brown.	39,400	2,600	10,700	27,500					80,200
General Rubber Co.	11,200		2,240						13,440
H. A. Astlett & Co.	42,560	1,120	8,960	126,560					179,200
AUGUST 6.—By the <i>A. W. Selmer</i> —Para.									
Henderson & Korn	28,500	2,950	19,620	43,750	64,200				159,540
W. R. Grace & Co.	45,973	18,062	5,403	1,100	18,150				88,688
AUGUST 8.—by the <i>Colon</i> —Arequipa.									
W. R. Grace & Co.						10,061			10,061
AUGUST 20.—By the <i>Tampico</i> —Manaos.									
W. R. Grace & Co.	9,760	640	285	34,870					45,555
General Rubber Co.	44,800								44,800
H. A. Astlett & Co.	12,320		2,240	8,960					23,520
AUGUST 23.—By the <i>Wagland</i> —Para.									
W. R. Grace & Co.	56,797		8,781	22,482	6,534				94,594
Henderson & Korn	31,200	3,540	9,840	11,200	7,510				63,290
General Rubber Co.						123,200			123,200
H. A. Astlett & Co.	146,720	2,240	23,500	124,320					296,780
Arnold & Zeiss.	37,500	2,400	25,000	2,200	3,800				70,900
AUGUST 27.—By the <i>Imperial</i> —Arequipa.									
W. R. Grace & Co.	9,065		1,422	23,473					33,960

PLANTATIONS.		POUNDS.		GUAYULE.		POUNDS.	
TO NEW YORK.							
JULY 3.—By the <i>Malagan</i> —London:				JULY 29.—By the <i>El Alba</i> —Galveston:		58,000	
Fred Stern & Co.	21,750			Continental Rubber Co. of New York...		37,000	
JULY 3.—By the <i>Cannanonshire</i> —Far East:				August 6.—By the <i>El Mundo</i> —Galveston:		51,000	
Fred Stern & Co.	26,880			Continental Rubber Co. of New York...		52,000	
JULY 3.—By the <i>Kumeria</i> —Far East:				August 8.—By the <i>El Siglo</i> —Galveston:		157,500	
Fred Stern & Co.	13,440			Continental Rubber Co. of New York...			
JULY 9.—By the <i>Bracco</i> —Batavia:				August 17.—By the <i>Alamo</i> —Galveston:			
General Rubber Co.	279,000			Continental Rubber Co. of New York...			
JULY 10.—By the <i>Nhamoi Maru</i> —Singapore:				August 9.—By the <i>Karimata</i> —Batavia:		16,800	
General Rubber Co.	1,321,600			August 20.—By the <i>Turrialba</i> —San Jose:		451	
JULY 11.—By the <i>Rondo</i> —Batavia:				August 23.—By the <i>Wagland</i> —Para:		682	
J. T. Johnstone & Co.	8,587						
JULY 11.—By the <i>C. of Africa</i> —Singapore:							
J. T. Johnstone & Co.	4,480						
JULY 11.—By the <i>Penang</i> —Batavia:							
J. T. Johnstone & Co.	27,746						
JULY 11.—By the <i>Penang</i> —Batavia:							
J. T. Johnstone & Co.	36,480						
JULY 13.—By the <i>Kangean</i> —Batavia:							
J. T. Johnstone & Co.	59,485						
JULY 13.—By the <i>Wakasa Maru</i> —Far East:							
Fred Stern & Co.	4,480						
JULY 17.—By the <i>Kandahar</i> —Colombo:							
Fred Stern & Co.	17,920						
JULY 22.—By the <i>China</i> —Singapore:							
General Rubber Co.	280,000						
JULY 23.—By the <i>Unkai Maru</i> —Singapore:							
General Rubber Co.	757,100						
Meyer & Brown.		201,600					
JULY 24.—By the <i>Malakuta</i> —London:							
Meyer & Brown.	22,700						
JULY 31.—By the <i>Euryades</i> —Ceylon:							
J. T. Johnstone & Co.	47,432						
AUGUST 1.—By the <i>Bawean</i> —Batavia:							
J. T. Johnstone & Co.	489,402						
AUGUST 1.—By the <i>Kwantu Maru</i> —Far East:							
Fred Stern & Co.	11,200						
AUGUST 1.—By the <i>Mamehara</i> —London:							
Rubber Trading Co.	15,000						
AUGUST 3.—By the <i>C. of Africa</i> —Ceylon:							
Fred Stern & Co.	107,520						
AUGUST 3.—By the <i>C. of Africa</i> —Ceylon:							
Rubber Trading Co.	11,200						
AUGUST 3.—By the <i>C. of Africa</i> —Ceylon:							
Henderson & Korn.	22,400						
AUGUST 3.—By the <i>Saxonia</i> —London:							
Arnold & Zeiss.	11,200						
AUGUST 6.—By the <i>Andama</i> —Liverpool:							
Aldens' Successors, Ltd.	7,000						
AUGUST 6.—By the <i>Burma Maru</i> —Yokohama:							
J. T. Johnstone & Co.	99,040						
AUGUST 6.—By the <i>Bente Maru</i> —East:							
Rubber Trading Co.	20,000						
AUGUST 7.—By the <i>Bankoku Maru</i> —Singapore:							
Hagemeyer Trading Co.	6,720						
AUGUST 8.—By the <i>Talabot</i> —Colombo:							
Arnold & Zeiss.	19,000						
AUGUST 9.—By the <i>Karimata</i> —Batavia:							
W. R. Grace & Co.	98,900						
AUGUST 9.—By the <i>Karimata</i> —Batavia:							
General Rubber Co.	347,500						
AUGUST 9.—By the <i>Karimata</i> —Batavia:							
J. T. Johnstone & Co.	43,089						
AUGUST 9.—By the <i>Karimata</i> —Batavia:							
Meyer & Brown.	26,600						
AUGUST 9.—By the <i>Karimata</i> —Batavia:							
Hagemeyer Trading Co.	52,640						
AUGUST 10.—By the <i>Taurus</i> —East:							
Fred Stern & Co.	134,400						
AUGUST 10.—By the <i>Taurus</i> —East:							
W. R. Grace & Co.	49,104						
AUGUST 10.—By the <i>Taurus</i> —East:							
Henderson & Korn.	653,800						
AUGUST 10.—By the <i>Taurus</i> —East:							
Aldens' Successors, Ltd.	54,000						
AUGUST 10.—By the <i>Taurus</i> —East:							
J. T. Johnstone & Co.	499,665						
AUGUST 10.—By the <i>Taurus</i> —East:							
Meyer & Brown.	100,900						
AUGUST 10.—By the <i>Taurus</i> —East:							
Rubber Trading Co.	150,000						
AUGUST 11.—By the <i>Tensho Maru</i> —Far East:							
Fred Stern & Co.	2,240						
AUGUST 13.—By the <i>Baltic</i> —London:							
Aldens' Successors, Ltd.	63,800						

AUGUST 15.—By the <i>Louise Nielson</i> —Ceylon:		POUNDS.	
Fred Stern & Co.	112,000		
J. T. Johnstone & Co.	106,577		
Meyer & Brown.	44,800		
AUGUST 17.—By the <i>Manila Maru</i> —Ceylon:			
Hagemeyer Trading Co.	17,920		
AUGUST 20.—By the <i>Wills</i> —Batavia:			
Fred Stern & Co.	32,360		
AUGUST 20.—By the <i>Wills</i> —Batavia:			
J. T. Johnstone & Co.	8,960		
AUGUST 20.—By the <i>Wills</i> —Batavia:			
J. T. Johnstone & Co.	35,840		
AUGUST 20.—By the <i>Wills</i> —Batavia:			
General Rubber Co.	286,700		
AUGUST 20.—By the <i>Wills</i> —Batavia:			
W. R. Grace & Co.	8,960		
AUGUST 21.—By the <i>Lycan</i> —London:			
Aldens' Successors, Ltd.	520,000		
AUGUST 21.—By the <i>Grigua</i> —Far East:			
Fred Stern & Co.	6,720		
AUGUST 21.—By the <i>Grigua</i> —Far East:			
Kong:			
Arnold & Zeiss.	229,000		
AUGUST 21.—By the <i>Lycan</i> —London:			
Fred Stern & Co.	156,800		
AUGUST 21.—By the <i>Lycan</i> —London:			
Rubber Trading Co.	135,000		
AUGUST 21.—By the <i>Siberia Maru</i> —Singapore:			
General Rubber Co.	219,500		
AUGUST 21.—By the <i>Siberia Maru</i> —Singapore:			
By the <i>Philadelphian</i> —London:			
Henderson & Korn.	475,200		
AUGUST 21.—By the <i>Siberia Maru</i> —Singapore:			
Rubber Trading Co.	11,900		
AUGUST 21.—By the <i>Siberia Maru</i> —Singapore:			
Fred Stern & Co.	13,440		
AUGUST 21.—By the <i>Siberia Maru</i> —Singapore:			
Rubber Trading Co.	18,000		
AUGUST 21.—By the <i>Siberia Maru</i> —Singapore:			
By the <i>Wakasa Maru</i> —Far East:			
Henderson & Korn.	82,300		
AUGUST 21.—By the <i>Siberia Maru</i> —Singapore:			
Rubber Trading Co.	33,600		
AUGUST 21.—By the <i>Siberia Maru</i> —Singapore:			
Rubber Trading Co.	5,000		
AUGUST 21.—By the <i>Siberia Maru</i> —Singapore:			
Henderson & Korn.	62,600		
AUGUST 21.—By the <i>Siberia Maru</i> —Singapore:			
Meyer & Brown.	15,700		
AUGUST 21.—By the <i>Siberia Maru</i> —Singapore:			
Meyer & Brown.	11,500		
AUGUST 21.—By the <i>Siberia Maru</i> —Singapore:			
By the <i>Euryades</i> —London:			
Meyer & Brown.	11,400		
AUGUST 21.—By the <i>Siberia Maru</i> —Singapore:			
By the <i>Shikoku</i> —Penang:			
Meyer & Brown.	2,200		
AUGUST 21.—By the <i>Siberia Maru</i> —Singapore:			
By the <i>Mexico Maru</i> —Penang:			
Meyer & Brown.	4,500		
AUGUST 21.—By the <i>Siberia Maru</i> —Singapore:			
By the <i>Princess Juliana</i> —Sourabaya:			
Meyer & Brown.	60,100		
AUGUST 21.—By the <i>Siberia Maru</i> —Singapore:			
By the <i>Euryades</i> —Far East:			
Fred Stern & Co.	212,800		
AUGUST 21.—By the <i>Siberia Maru</i> —Singapore:			
By the <i>Tjondani</i> —Sourabaya:			
Meyer & Brown.	33,000		
AUGUST 21.—By the <i>Siberia Maru</i> —Singapore:			
By the <i>Madison</i> —			
Hagemeyer Trading Co.	56,000		
AUGUST 21.—By the <i>Siberia Maru</i> —Singapore:			
By the <i>Keemun</i> —Far East:			
Fred Stern & Co.	33,600		
AUGUST 21.—By the <i>Siberia Maru</i> —Singapore:			
By the <i>Kirin Maru</i> —			
Hagemeyer Trading Co.	20,160		
AUGUST 21.—By the <i>Siberia Maru</i> —Singapore:			
By the <i>Cannanonshire</i> —			
Hagemeyer Trading Co.	8,960		
AUGUST 21.—By the <i>Siberia Maru</i> —Singapore:			
By the <i>Saka Maru</i> —			
Hagemeyer Trading Co.	38,080		
AUGUST 21.—By the <i>Siberia Maru</i> —Singapore:			
By the <i>Nippon</i> —Far East:			
Fred Stern & Co.	42,560		
AUGUST 21.—By the <i>Siberia Maru</i> —Singapore:			
W. R. Grace & Co.	38,110		
AUGUST 21.—By the <i>Siberia Maru</i> —Singapore:			
Henderson & Korn.	26,000		

AFRICANS.	
JULY 16.—By the <i>New York</i> —England:	
Fred Stern & Co.	3,480
AUGUST 1.—By the <i>Aurania</i> —Liverpool:	
Rubber Trading Co.	11,200

BALATA.	
AUGUST 23.—By the <i>Prins der Nederlanden</i> —	
Paramaribo:	
Müller, Schall & Co.	28,598

CRUDE RUBBER ARRIVALS AT SEATTLE.	
PLANTATIONS.	
TO AKRON, OHIO.	
JUNE 17.—By the <i>Louise Nielson</i> —Singapore:	
(Supplementary.)	
POUNDS.	
The Goodyear Tire & Rubber Co.	45,360
AUGUST 6.—By the <i>Burma Maru</i> —Yokohama:	
The Goodyear Tire & Rubber Co.	106,650
The B. F. Goodrich Co.	1,013,580
Firestone Tire & Rubber Co.	400,545
J. T. Johnstone & Co.	17,415 1,538,190
AUGUST 6.—By the <i>Bankoku Maru</i> —Singapore:	
The Goodyear Tire & Rubber Co.	608,175
Meyer & Brown	33,615
J. T. Johnstone & Co.	76,680 718,470
AUGUST 7.—By the <i>Calcutta Maru</i> —Kobe:	
The Goodyear Tire & Rubber Co.	88,830
J. T. Johnstone & Co.	24,840 113,670
AUGUST 20.—By the <i>Canada Maru</i> —Yokohama:	
The B. F. Goodrich Co.	211,815
AUGUST 22.—By the <i>Tensho Maru</i> —Kobe:	
J. T. Johnstone & Co.	17,955
The Goodyear Tire & Rubber Co.	42,120 60,075
AUGUST 22.—By the <i>Ujina Maru</i> —Kobe:	
The Goodyear Tire & Rubber Co.	34,695
TO SEATTLE, WASH.	
AUGUST 6.—By the <i>Burma Maru</i> —Yokohama:	
Mitsui & Co., Limited.	42,120
Henderson & Korn.	56,700
L. Littlejohn & Co.	105,030
Robinson & Co.	8,370
The Goodyear Tire & Rubber Co.	32,400 244,620
AUGUST 6.—By the <i>Bankoku Maru</i> —Singapore:	
W. R. Grace & Co.	7,020
Aldens' Successors, Ltd.	39,420
Henderson & Korn.	32,535
East Asiatic Co.	1,890
L. Littlejohn & Co.	148,500
The B. F. Goodrich Co.	666,765
Meyer & Brown.	3,240
The Goodyear Tire & Rubber Co.	6,345
Robinson & Co.	40,500
Arthur Meyer & Co.	7,290
Raw Products Co.	22,680
Rubber Trading Co.	3,645 979,830

POUNDS		
AUGUST 7.—By the <i>Calcutta Maru</i> =Kobe:		
Arthur Meyer & Co.....	1,620	
Robinson & Co.....	38,475	
W. R. Grace & Co.....	15,795	
Mitsui & Co., Limited.....	56,835	112,725
AUGUST 6.—By the <i>Bankoku Maru</i> =Singapore:		
L. Littlejohn & Co. (Gutta percha).....	21,600	
L. Littlejohn & Co. (Gutta jelutong).....	120,590	242,190

TO NEW YORK.

AUGUST 6.—By the <i>Azumasen Maru</i> =Kobe:		
Mitsui & Co., Limited.....	65,610	

AUGUST 6.—By the <i>Burma Maru</i> =Yokohama:		
Henderson & Korn.....	290,655	
Rubber Trading Co.....	27,540	
William H. Stiles.....	54,810	
L. Littlejohn & Co.....	73,440	
Edward Maurer Co.....	90,450	
Robinson & Co.....	74,655	
Arthur Meyer & Co.....	25,245	
Hadden & Co.....	94,905	
Robert Badenhop Co.....	131,760	
Charles T. Wilson Co., Inc.....	119,610	983,070

AUGUST 6.—By the <i>Bankoku Maru</i> =Singapore:		
United States Rubber Co.....	292,950	
Robinson & Co.....	80,190	
L. Littlejohn & Co.....	71,280	
Aldens' Successors, Ltd.....	52,785	
J. T. Johnstone & Co.....	52,785	
Charles T. Wilson Co., Inc.....	17,820	
Arthur Meyer & Co.....	22,275	
Rubber Trading Co.....	15,255	
Fred Stern & Co.....	18,090	623,430

AUGUST 6.—By the <i>Calcutta Maru</i> =Kobe:		
Aldens' Successors, Ltd.....	10,800	
Arthur Meyer & Co.....	10,260	
L. Littlejohn & Co.....	34,155	
Robinson & Co.....	8,775	
W. R. Grace & Co.....	25,245	
Charles T. Wilson Co., Inc.....	17,550	
E. G. Curry.....	56,970	
William H. Stiles.....	45,360	
Edward Maurer & Co.....	43,335	
Rubber Trading Co.....	18,225	270,675

AUGUST 20.—By the <i>Canada Maru</i> =Yokohama:		
The United States Rubber Co.....	248,000	

AUGUST 22.—By the <i>Tensho Maru</i> =Kobe:		
W. R. Grace & Co.....	20,925	
Various.....	252,450	273,375

AUGUST 22.—By the <i>Ujina Maru</i> =Kobe:		
W. R. Grace & Co.....	17,685	
L. Littlejohn & Co.....	8,100	25,785

TO VANCOUVER.

AUGUST 6.—By the <i>Bankoku Maru</i> =Singapore:		
L. Littlejohn & Co.....	11,475	
The Goodyear Tire & Rubber Co.....	53,190	
The Canadian Pacific Ry. Co.....	1,772,280	
United States Rubber Co.....	299,565	2,136,510

TO WATERTOWN, MASS.

AUGUST 6.—By the <i>Burma Maru</i> =Yokohama:		
Hood Rubber Co.....	102,195	

TO SAN FRANCISCO, CAL.

AUGUST 6.—By the <i>Calcutta Maru</i> =Kobe:		
L. Littlejohn & Co.....	6,480	

PONTIANAK.

TO AKRON, OHIO.

AUGUST 6.—By the <i>Bankoku Maru</i> =Singapore:		
The United Malaysian Rubber Co. (Gutta untreated).....	67,500	

TO NEW YORK.

AUGUST 6.—By the <i>Bankoku Maru</i> =Singapore:		
The United Malaysian Rubber Co. (Gutta untreated).....	258,525	

AUGUST 17.—By the <i>Inaba Maru</i> =Yokohama:		
Aldens' Successors, Ltd. (Gutta jelutong).....	810	

CRUDE RUBBER ARRIVALS AT SAN FRANCISCO.

PLANTATIONS.

TO SAN FRANCISCO.

JULY 27.—By the <i>Princess Juliana</i> =Sourabaya:		
H. B. M. Consul General.....	141,345	
Edward Maurer & Co.....	236,115	
Arnold & Zeiss.....	32,670	
L. Littlejohn & Co.....	34,560	
National City Bank of N. Y.....	59,130	
The Goodyear Tire & Rubber Co.....	397,305	
Firestone Tire & Rubber Co.....	436,050	
J. T. Johnstone & Co.....	19,710	1,356,885

POUNDS		
AUGUST 3.—By the <i>Glenogle Persia</i> =Singapore:		
Bowers Rubber Works.....	10,260	
Henderson & Korn.....	152,010	
The B. F. Goodrich Co.....	106,245	268,515

AUGUST 5.—By the <i>Willis</i> =Batavia:		
Arnold & Zeiss.....	104,220	
L. Littlejohn & Co.....	3,915	
W. Peabody.....	13,770	
Edward Maurer & Co.....	49,545	
MacDonald Sons.....	20,250	
Various.....	99,900	
Firestone Tire & Rubber Co.....	273,240	
The Goodyear Tire & Rubber Co.....	215,865	
J. T. Johnstone & Co.....	17,280	
The B. F. Goodrich Co.....	231,795	1,029,780

AUGUST 14.—By the <i>Korea Maru</i> =Singapore:		
The Goodyear Tire & Rubber Co.....	39,420	
J. T. Johnstone & Co.....	123,390	
The B. F. Goodrich Co.....	190,890	
Henderson & Korn.....	350,055	
William H. Stiles & Co.....	18,225	
E. G. Curry.....	6,885	
Edward Maurer & Co.....	4,590	
L. Littlejohn & Co.....	4,590	
Rubber Trading Co.....	10,125	
Arthur Meyer & Co.....	27,810	
Robinson & Co.....	11,610	789,885
United States Rubber Co.....	11,610	

AUGUST 15.—By the <i>Colombia</i> =Colombo:		
S. L. Jones & Co.....	10,395	
The Goodyear Tire & Rubber Co.....	10,665	
Meyer & Brown.....	29,970	
J. T. Johnstone & Co.....	12,690	
Rubber Trading Co.....	9,450	
Edward Maurer & Co.....	22,680	
William H. Stiles & Co.....	20,520	116,370

AUGUST 15.—By the <i>Bintang</i> =Sourabaya:		
Various.....	409,050	
Edgar & Co.....	9,045	
L. Littlejohn & Co.....	87,885	
J. D. Speckles Co. (Samples).....	135	
Edward Maurer & Co.....	8,640	
Raw Products Co.....	1,890	
The Goodyear Tire & Rubber Co.....	43,875	560,520

AUGUST 18.—By the <i>Rembrandt</i> =Sourabaya:		
L. Littlejohn & Co.....	223,695	
Edward Maurer & Co.....	141,480	
Savage Tire Co.....	6,480	
The Goodyear Tire & Rubber Co.....	52,110	
The B. F. Goodrich Co.....	160,920	
Firestone Tire & Rubber Co.....	69,795	
Winters Sons & Co.....	27,945	
Manhattan Rubber Co.....	42,525	
T. Guidanus.....	43,200	
Arnold & Zeiss.....	86,670	
Various.....	46,035	900,855

PONTIANAK.

AUGUST 5.—By the <i>Willis</i> =Batavia:		
L. Littlejohn & Co.....	27,000	
First National Bank of San Francisco.....	10,800	37,800

AUGUST 15.—By the <i>Colombia</i> =Colombo:		
Busk & Daniels (Gutta percha).....	4,185	

STATISTICS OF CRUDE AND MANUFACTURED RUBBER AT THE PORT OF NEW YORK.

IMPORTS.

June, 1917.		
UNMANUFACTURED—free:	POUNDS	VALUE.
India rubber:		
From—		
Malta.....	4,836	\$1,907
Portugal.....	401,320	121,344
England.....	10,719,733	7,733,062
British Honduras.....	316	95
Costa Rica.....	24,131	14,312
Guatemala.....	12,508	3,492
Honduras.....	7,895	5,180
Nicaragua.....	55,035	26,456
Panama.....	26,042	8,638
Salvador.....	4,055	2,197
Mexico.....	124,561	53,330
Other British West Indies.....	7,178	5,968
Cuba.....	3,314	1,678
Brazil.....	9,410,413	3,606,244
Colombia.....	87,077	37,325
Ecuador.....	27,223	12,622
Dutch Guiana.....	1,375	1,264
Peru.....	47,704	25,723
Venezuela.....	22,100	12,810
British India.....	13,320	7,507
Straits Settlements.....	4,342,407	2,428,706
Other British East Indies.....	975,400	607,329
Dutch East Indies.....	5,979,721	3,620,336
Totals.....	32,297,664	\$18,337,475

June, 1917.		
UNMANUFACTURED—free:	POUNDS	VALUE
Gutta Percha—free:		
Straits Settlements.....	2,010	\$2,880
Totals.....	2,010	\$2,880

Gutta jelutong—dutiable:		
Dutch East Indies.....	2,491,417	\$98,808
Straits Settlements.....	1,473,314	72,912
Totals.....	3,964,731	\$171,720

Balata—free:		
Canada.....	100,717	\$47,578
Trinidad.....	50	13
Other British West Indies.....	12,981	10,126
Colombia.....	70,116	30,098
Dutch Guiana.....	95,740	70,347
Venezuela.....	81,767	35,633
Totals.....	361,371	\$193,795

Rubber Scrap—free:		
France.....	371,501	\$21,971
Italy.....	70,400	15,502
England.....	1,256,136	96,554
Panama.....	6,241	351
Jamaica.....	940	75
Cuba.....	72,728	5,137
San Domingo.....	233	12
Brazil.....	50,706	6,980
Venezuela.....	9,815	303
Australia.....	64,797	3,018
Totals.....	1,903,497	\$149,903

Guayule—free:		
Venezuela.....	8,984	\$3,985
Totals.....	8,984	\$3,985

Totals Unmanufactured.....	38,538,257	\$18,859,758
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Rubber substitute—dutiable:		
England.....		\$4,740
Colombia.....		901
Totals.....		\$5,641

MANUFACTURED—		
India Rubber—dutiable:		
France.....		\$25
Switzerland.....		242
England.....		32,051
Scotland.....		1,582
Canada.....		4,288
Straits Settlements.....		2,555
Japan.....		3,208
Totals.....		\$43,951

Gutta Percha—dutiable:		
England.....		\$1,389
Scotland.....		1,123
Total.....		\$2,512

EXPORTS OF DOMESTIC MERCHANDISE.

June, 1917.		
MANUFACTURED—	POUNDS.	VALUE.
Automobile tires:		
France.....		\$74,992
Italy.....		57,317
England.....		318,865
Cuba.....		81,066
Argentina.....		88,994
Brazil.....		95,357
Chile.....		39,273
Uruguay.....		24,661
New Zealand.....		25,237
Other Countries.....		154,040
Total.....		\$959,802

All other tires.....		\$124,228
Belting.....		280,264
Rubber boots—pairs.....	2,418	9,702
Rubber shoes—pairs.....	90,478	6,548
Scrap rubber.....	146,007	20,007
Reclaimed rubber.....	8,450	1,583
Other rubber manufactures.....		456,562
Total manufactured.....		\$1,858,696

EXPORTS OF FOREIGN MERCHANDISE.

June, 1917		
UNMANUFACTURED	POUNDS.	VALUE.
India rubber.....	34	\$25
Totals.....	34	\$25

RUBBER STATISTICS FOR THE UNITED STATES.

IMPORTS OF CRUDE AND MANUFACTURED RUBBER.

May, 1917.		
	POUNDS.	VALUE.
From—		
Portugal	11,161	\$7,812
United Kingdom	1,074,426	397,724
Central American States and British Honduras	11,889,420	8,456,517
Mexico	89,759	39,552
Other South America	71,933	24,941
East Indies	5,175,512	2,136,604
Other countries	498,265	220,635
Totals	17,930,776	11,320,585
Crude rubber	1,275,237	771,347
Manufactured	38,016,489	\$23,375,718
Palata	176,609	\$85,574
Gutta jelutong	489,253	137,450
Gutta percha	2,320,221	91,796
Other rubber goods	17,902	6,634
Totals	41,020,474	\$23,697,172
Rubber scrap	1,571,153	114,415
Totals, unmanufactured	42,591,627	\$23,811,587
Chicle	439,927	\$228,787
Manufactured		\$9,477
Crude rubber		72,998
Totals, manufactured		\$82,475
Substitutes—elasticon, etc.		\$2,807

EXPORTS OF DOMESTIC MERCHANDISE.

May, 1917.		
	POUNDS.	VALUE.
Automobile tires:		
To—		
France		\$56,418
London		89,030
Canada		275,861
Mexico		36,580
Other countries		136,182
Australia		30,569
New Zealand		62,091
Philippine Islands		44,431
Other countries		559,486
Total		\$1,271,248
All other tires		128,928
Belting, hose and packing		260,496
Rubber boots		29,975
Rubber shoes		241,677
Scrap and old rubber		600,193
Reclaimed rubber		334,824
Other rubber manufactures		746,897
Total, manufactured		\$2,729,075
Fountain pens		17,284

EXPORTS OF FOREIGN MERCHANDISE.

May, 1917.		
	POUNDS.	VALUE.
UNMANUFACTURED—		
Palata	49,222	\$28,945
Guayule gum		
Gutta jelutong	432	302
Gutta percha	573,162	399,381
Rubber scrap and refuse		
Totals, unmanufactured	582,816	\$428,628
MANUFACTURED—		
Chicle	6,673	\$2,927
Gutta percha		\$120
India rubber		790
Total		\$910

EXPORTS OF RUBBER GOODS TO NON-CONTIGUOUS TERRITORIES OF THE UNITED STATES.

May, 1917.		
	POUNDS.	VALUE.
MANUFACTURED—		
To—		
Alaska		
Belting, hose and packing		\$25,169
Boots and shoes	14,975	42,772
Other rubber goods		5,628
Total		\$73,569

May, 1917.		
	POUNDS.	VALUE.
MANUFACTURED—		
To—		
Belting, hose and packing		\$7,861
Automobile tires		79,066
Other rubber goods		3,781
Other rubber goods		33,129
Total		\$123,837
TO—		
Philippine Islands:		
Belting, hose and packing		\$6,770
Boots and shoes	12,627	7,817
Other rubber goods		49,678
Other rubber goods		11,845
Total		\$76,110
Porto Rico:		
Belting, hose and packing		\$5,240
Automobile tires		55,433
Other rubber goods		246
Other rubber goods		6,844
Total		\$67,763

UNITED KINGDOM RUBBER STATISTICS.

The import and export figures by countries usually published in this table are withheld by the British Government.

IMPORTS.

June, 1917.		
	Pounds.	£
UNMANUFACTURED		
Crude rubber	17,196,300	2,483,801
Waste and reclaimed rubber	150,800	3,169
Gutta percha	449,680	67,786
Totals	17,796,780	2,554,756
MANUFACTURED—		
Apparel, waterproofed		623
Boots and shoes	14,933	21,950
Insulated wire		1,999
Automobile tires and tubes		154,449
Motorcycle tires and tubes		782
Cycle tires and tubes		1,988
Tires not specified		1,083
Totals		182,874

EXPORTS.

June, 1917.		
	Pounds.	£
UNMANUFACTURED		
Waste and reclaimed rubber	1,567,000	30,811
MANUFACTURED—		
Apparel, waterproofed		55,325
Boots and shoes	8,319	9,540
Insulated wire		31,968
Automobile tires and tubes		145,952
Motorcycle tires and tubes		9,836
Cycle tires and tubes		46,073
Tires not specified		9,887
Manufactures not specified		147,661
Total		459,242

EXPORTS—FOREIGN AND COLONIAL.

June, 1917.		
	Pounds.	£
UNMANUFACTURED		
Crude rubber	10,990,300	1,709,018
Waste and reclaimed rubber		
Gutta percha	47,600	3,269
Totals	11,037,900	1,712,287
MANUFACTURED—		
Apparel, waterproofed		23
Boots and shoes	1,944	2,676
Insulated wire		6,618
Automobile tires and tubes		52,978
Motorcycle tires and tubes		4,185
Cycle tires and tubes		419
Tires not specified		25
Total		66,924

LONDON AND LIVERPOOL RUBBER STATISTICS.

The import and export figures by countries usually published in this table are withheld by the British Government.

IMPORTS.

June, 1917.		
	Pounds.	£
UNMANUFACTURED		
Crude rubber:		
At—		
London	13,662,600	2,039,755
Liverpool	2,891,100	375,017
Totals	16,553,700	2,414,772

June, 1917.		
	Pounds.	£
UNMANUFACTURED		
Waste and reclaimed rubber:		
At—		
London	27,500	1,029
Liverpool	82,200	1,113
Totals	109,700	2,142

EXPORTS.

June, 1917.		
	Pounds.	£
Waste and reclaimed rubber manufactures of the United Kingdom:		
From—		
London	880,600	14,348
Liverpool	376,200	11,259
Totals	1,256,800	25,607

REEXPORTS.

June, 1917.		
	Pounds.	£
Crude rubber:		
From—		
London	9,126,400	1,465,209
Liverpool	1,519,300	202,511
Totals	10,645,700	1,667,720

RUBBER STATISTICS FOR THE DOMINION OF CANADA.

The import and export figures by countries usually published in this table are withheld by the Canadian Government.

IMPORTS OF CRUDE AND MANUFACTURED RUBBER.

May, 1917.		
	Pounds.	Value.
UNMANUFACTURED		
Rubber and gutta percha, crude caoutchouc or india rubber	1,904,031	\$1,263,581
Rubber, recovered	613,455	84,728
Hard rubber, in sheets and rods	3,103	2,496
Rubber substitute	42,067	3,814
Rubber, powdered, and rubber or gutta percha waste	210,938	10,402
Rubber thread, not covered	4,620	6,622
Chicle	182,294	70,161
Totals		
MANUFACTURED—durable:		
Boots and shoes	\$13,088	\$5,223
Belting	10,767	7,449
Waterproof clothing	23,516	47,957
Hose, lined with rubber	12,501	
Mats and matting	573	
Packing	10,081	339
Tires of rubber for all vehicles	192,466	2,654
Rubber cement and all manufactures of india rubber and gutta percha—N. O. P.	91,079	26,876
Hard rubber, unfinished, in tubes for fountain pens	875	
Webbing—over one inch wide	19,496	699

EXPORTS OF DOMESTIC AND FOREIGN RUBBER GOODS.

May, 1917.		
	Produce of Canada.	Reexports of Foreign Goods.
MANUFACTURED—		
Belting	\$3,277	
Hose	15,865	
Boots and shoes	73,824	48
Waterproof clothing		82
Tires	143,669	142
Waste	32,219	
All other, N. O. P.	3,780	598,223
Chicle, crude	215,884	

RUBBER STATISTICS FOR ITALY. IMPORTS OF CRUDE AND MANUFACTURED RUBBER.

Three Months Ending March, 1917.		
	Pounds.	LIRE.
UNMANUFACTURED—		
India rubber and gutta percha—raw and reclaimed:		
From—		
Great Britain	362,780	
Straits Settlements	12,320	
African French colony	12,540	
Belgian Congo	119,900	
Brazil	1,294,480	
Other countries	705,100	
Totals	2,507,120	9,116,800

Three Months Ending March, 1917.			Three Months Ending March, 1917.			Three Months Ending March, 1917.		
UNMANUFACTURED			MANUFACTURED			MANUFACTURED		
POUNDS.	LIRE.		POUNDS.	LIRE.		POUNDS.	LIRE.	
Rubber scrap	187,660	76,770	Tires and tubes:			Elastic webbing:		
MANUFACTURED			From—			To—		
India rubber and gutta percha			France	85,580		France	1,320	
threads:			Great Britain	104,500		Great Britain	3,740	
From—			Other countries	12,980		Spain	4,800	
Great Britain	6,820		Totals	203,060	1,846,000	Switzerland	23,760	
United States	7,040		Other rubber manufactures:			Egypt	4,620	
Other countries	880		From—			Argentina	17,600	
Totals	14,740	134,000	France	15,180		Brazil	38,720	
India rubber and gutta percha			Great Britain	62,260		Chile	4,620	
sheets:			United States	19,800		Cuba	6,600	
Cut sheets	220	1,700	Other countries	440		Other countries	8,360	
Hard rubber	4,840	17,600	Totals	97,680	355,200	Clothing and articles for		
India rubber and gutta percha			Total imports	12,042,170		travel	4,180	43,700
tubes:			EXPORTS OF CRUDE AND MANUFACTURED					
From cut sheet	220	1,800	RUBBER.			Articles not specified:		
Elastic fabrics	6,600	18,000	Three Months Ending			From cut sheets:		
Other forms	1,320	4,200	March, 1917.			To—		
Belting	28,380	90,300	UNMANUFACTURED—		POUNDS.	LIRE.		
Rubber coated fabrics	11,660	74,200	India rubber and gutta percha			Great Britain	660	
Other fabrics:			—raw and reclaimed:			Argentina	3,960	
From—			To—			Uruguay	1,760	
Great Britain	5,060		Spain	72,600		Other countries	220	
Other countries	2,420		United States	271,920		Totals	6,600	60,000
Totals	7,480	34,000	Totals	344,520	636,400	Fabrics	9,020	36,900
Boots and shoes—pairs:			MANUFACTURED—			Tires and tubes:		
From—			India rubber and gutta percha			To—		
France	5,637		—threads:			France	255,640	
Great Britain	1,663		To—			Great Britain	773,520	
Totals	7,300	36,500	France	3,300		Switzerland	1,100	
Elastic Webbing:			Great Britain	4,620		India and Ceylon	190,080	
From			Spain	5,940		Australia	440	
France	10,340		Switzerland	3,520		Argentina	165,880	
Great Britain	1,980		Argentina	3,520		Brazil	77,880	
Other countries	2,200		Other countries	880		Other countries	337,040	
Totals	14,520	99,000	Totals	21,780	198,000	Totals	1,801,580	16,378,000
Articles not specified:			India rubber and gutta percha			Other rubber manufactures:		
From cut sheets	6,160	56,000	—sheets:			To—		
Fabrics:			Cut sheets	880	6,800	France	15,620	
From—			Elastic fabric	2,860	5,850	Great Britain	15,620	
France	3,300		Insulated wire	220	300	Spain	2,420	
Great Britain	10,780		Hard rubber	8,360	30,400	Switzerland	11,000	
Other countries	5,500		India rubber and gutta percha			Egypt	660	
Totals	19,580	80,100	—tubes:			Argentina	29,700	
			Elastic fabric	9,460	25,800	Brazil	10,560	
			Other forms	19,580	62,300	Uruguay	3,740	
			Belting	440	1,400	Other countries	7,260	
			Rubber coated fabrics	18,700	72,250	Totals	96,580	351,200
						Total exports	18,677,800	

UNITED STATES TRADE WITH SOUTH AMERICAN STATES.

IMPORTS.	Pounds.				Value.			
	1916.	1915.	1914.	1913.	1916.	1915.	1914.	1913.
Crude india rubber:								
From—								
Brazil	49,822,000	51,473,000	44,686,000	40,452,000	\$24,589,000	\$21,422,000	\$17,822,000	\$19,867,000
Colombia	750,000	426,000	382,000	636,000	327,000	182,000	176,000	435,000
Ecuador	661,000	366,000	215,000	890,000	275,000	137,000	76,000	568,000
Panama	136,002	89,857			45,986	23,373		
Peru	3,476,000	3,154,000	1,017,000	352,000	1,703,000	1,334,000	427,000	303,000
Uruguay	78,743	100,344			66,200	73,425		
Venezuela	640,000	893,000	499,000	588,000	300,000	203,000	128,000	324,000
Totals	55,023,745	56,502,201	46,799,000	42,918,000	\$27,306,186	\$23,374,798	\$18,629,000	\$21,497,000
Balata:								
From—								
Panama	701,320	673,933			\$268,634	\$201,687		
Venezuela	640,000	893,000	499,000	588,000	235,000	280,000	\$212,000	\$280,000
Totals	1,341,320	1,566,933	499,000	588,000	\$503,634	\$481,687	\$212,000	\$280,000
Chicle:								
From—								
Venezuela	931,000	952,000	132,000	66,000	\$213,000	\$229,000	\$29,000	\$13,000
EXPORTS.								
Automobiles; number:								
To—								
Argentina	4,399	626	940	1,062	\$2,065,000	\$294,000	\$964,000	\$1,182,000
Venezuela	518	227	126	104	314,000	143,000	102,000	109,000
Totals	4,917	853	1,066	1,166	\$2,379,000	\$437,000	\$1,066,000	\$1,291,000
Insulated wire and cables:								
To—								
Brazil					\$286,000	\$143,000	\$323,000	
Rubber Belting:								
To—								
Chile					\$176,000	\$107,000	\$21,000	\$58,000

THE MARKET FOR RUBBER SCRAP.

Copyright 1917.

NEW YORK.

QUIET and dull expresses the situation that has prevailed in the rubber scrap market for the month just passed. August is usually given to shut-downs for repairs, new installations and stock taking. However, there was quiet trading, traceable to war orders that are keeping some of the rubber mills busy at this time. While the volume of business transacted has not been large in the aggregate, there was sufficient interest to support the market, and prices, with few exceptions, are the same as quoted a month ago. With the passing of the vacation period and the setting in of cooler weather, a more active interest in rubber scrap will doubtless be felt, as the mills are looking forward to a large fall business. While the low price of crude rubber may have had a quieting effect on the market, the fact that reclaim is a different material and an important factor in compounding and will create a demand of its own.

BOOTS AND SHOES. The trading in this material has been spotty and confined to carload lots on contract orders. New business has been hampered by uncertainty as to values, since transactions actually consummated were insufficient to establish prices. Boots and shoes were nominally held around $9\frac{3}{8}$ to $9\frac{1}{2}$ cents delivered to the mills, and arctics have shown but little improvement since a month ago. Trimmed arctics were nominally quoted around $7\frac{1}{2}$ cents, and untrimmed at $6\frac{1}{2}$ cents. The undertone is firm and holders are quietly waiting the resumption of fall business, confident in higher prices.

TIRES. The interest in tires has been almost negligible, with white G. & G. tires the dullest of all. The difference between this grade and mixed auto tires is so small as not to warrant the expense of sorting G. & G. tires; in fact, some holders have for some time classified both grades as standard mixed auto tires. Prices have shown very little change, standard white G. & G. tires being quoted at $7\frac{1}{8}$ to $7\frac{1}{4}$ cents, and standard mixed auto tires at $6\frac{1}{2}$ to 7 cents. Solid tires have been fairly active, the principal interest being shown in the clean material. The standard grade was $7\frac{1}{4}$ cents, and clean truck tires were $7\frac{1}{8}$ cents.

INNER TUBES. There appears to be an unwillingness on the part of small dealers to sell No. 1 tubes at present prices, with the patches removed in accordance with the new classification. The demand has been quiet for all grades of tubes, and very little movement has been noticed in this material during the month. Prices are largely nominal, with No. 1 tubes quoted $25\frac{1}{2}$ cents, and both No. 2 and red tubes at $13\frac{1}{2}$ cents.

MECHANICALS. Garden hose has had a fairly good call in some quarters, but the other grades have been very dull and uninteresting. Prices have remained practically unchanged from the quotations published a month ago.

UNITED STATES STATISTICS. For the fiscal year ended July 30, 1917, the imports of rubber scrap were 20,517,328 pounds, value \$1,569,448, compared to 16,371,573 pounds, value \$1,271,903, in 1916. Exports for the fiscal year ended June 30, 1917, were 3,819,627 pounds, value \$420,740, compared to 3,904,715 pounds, value \$400,148, in 1916. During the fiscal year of 1917 the exports of reclaimed rubber were 4,938,991 pounds, value \$814,199, compared to 6,406,946 pounds, value \$871,262, in 1916.

LONDON AND LIVERPOOL STATISTICS. The imports of waste and reclaimed rubber for June were 109,700 pounds, value £2,142, compared with 143,600 pounds for May, value £3,103. Exports of waste and reclaimed rubber manufactures of the United Kingdom for June were 1,256,800 pounds, value £25,607, compared to 904,100 pounds, value £14,947, for May.

NEW YORK QUOTATIONS FOR CARLOAD LOTS DELIVERED.

AUGUST 27, 1917.

Prices subject to change without notice.

	PER POUND.
Boots and shoes.....	\$0.09 $\frac{1}{2}$ @
Trimmed arctics .....	.07 $\frac{1}{2}$ @
Untrimmed arctics .....	.06 $\frac{1}{2}$ @
White tires, Goodrich and Goodyear.....	.07 $\frac{1}{8}$ @ .07 $\frac{1}{4}$
Auto tires, standard white.....	.07 $\frac{1}{4}$ @
standard mixed .....	.06 $\frac{3}{4}$ @ .07
stripped, unguaranteed .....	.05 $\frac{1}{2}$ @ .05 $\frac{1}{4}$
Auto peelings, No. 1.....	.10 @
No. 2.....	.09 @
Inner tubes, No. 1.....	*.25 $\frac{1}{2}$ @
free from patches and valve seats.....	*.25 $\frac{1}{2}$ @
No. 2.....	*.13 $\frac{1}{2}$ @
red	*.13 $\frac{1}{2}$ @
Irony tires .....	.02 $\frac{1}{2}$ @
Bicycle tires .....	.05 $\frac{1}{2}$ @
Solid tires .....	.07 $\frac{1}{4}$ @
Clean truck tires .....	.07 $\frac{7}{8}$ @
White scrap, No. 1.....	*.14 @
No. 2.....	*.10 @
Red scrap, No. 1.....	*.10 @
No. 2.....	*.07 $\frac{3}{4}$ @
Mixed black scrap, No. 1.....	.05 $\frac{1}{2}$ @
No. 2 .....	.04 $\frac{3}{4}$ @ .04 $\frac{1}{4}$
Rubber car springs.....	.05 $\frac{1}{2}$ @
Horse shoe pads.....	.05 @
Matting and packings.....	.01 $\frac{5}{8}$ @
Garden hose .....	.02 $\frac{1}{4}$ @
Air brake hose.....	.06 $\frac{1}{4}$ @
Cotton fire hose.....	.02 $\frac{7}{8}$ @
Large hose .....	.02 $\frac{1}{2}$ @
Hard rubber scrap, No. 1, bright fracture.....	.27 @ .28
Battery jars (black compound).....	.03 $\frac{3}{4}$ @ .03 $\frac{1}{4}$
Insulated wire stripping, free from fibre.....	.04 $\frac{1}{4}$ @
Rubber heels .....	.04 $\frac{1}{4}$ @

* Nominal.

THE MARKET FOR COTTON AND OTHER FABRICS.

Copyright, 1917.

NEW YORK.

EARLY in August the tendency of the American cotton market was upward, due to the government's report indicating that the new crop conditions had not improved, as was generally expected. There was a pronounced sentiment, however, that the prospects were really better than indicated by the last official figures and that the new crop has really improved. The situation failed to stimulate buying to any great extent and prices held firm. On August 1 middling spot cotton was selling for 25.26 cents, with December contracts at 24.49 cents. As the month progressed the market became nervous and the sentiment bearish, but selling was restricted by the uncertain crop situation. During the last week of the month the market eased off as the result of a more optimistic view of the new crop prospects, and prices declined. On August 28 middling spot cotton was quoted 23.10 cents in a quiet market.

The new crop picking is well advanced and prospects of early marketing are good and new cotton offers are coming in from various sections of the cotton belt.

The total new crop is estimated around 14,000,000 bales, compared to last year's world's consumption of 14,054,000 bales. There are many uncertainties, however, that may reduce the final outcome, such as frost and storms; and, moreover, the crop is capable of further improvement, so that the ultimate yield is still a speculative matter.

EGYPTIAN COTTON. The situation appears to be unchanged and while supplies are confidently expected the actual relief is not yet in sight. The Alexandria Cotton Co., Limited, reports the following new Egyptian cotton crop conditions: "Temperature has been constantly below normal and these conditions are unfavorable to a quick maturity. Last year we had at the same period continuous excessive heat which did much harm to the formation of the first picking bolls; this year the excessive cool-

ness will delay the formation of the first picking bolls and as a consequence they will suffer more from the pink boll worm attacks. In the northern districts considerable progress is to be noticed in the growth of the crop, but the original delay has not yet been recovered. The cotton leaf worm attack is now dying out everywhere. In general, the damage is less than last year. With regard to the pink boll worm, a sample of 100 bolls in Behera showed on examination, 16 bolls attacked by worms, and another sample from Menufia gave 25 per cent."

SEA ISLAND COTTON. The southern markets will open early in September and active demand is expected for all grades of this staple at high prices. However, the U. S. Census Bureau reports 41,149 bales of Sea Island cotton at the mills and 23,405 bales in warehouse, making a total of 64,554 bales unconsumed on June 30, that may prevent early buying at high prices. Increase in acreage is reported in the entire belt and crop conditions as a whole are promising despite the apprehension felt in some districts where the boll-weevil has already appeared. Should favorable weather conditions prevail and the pests be controlled, a final crop of 125,000 bales may be expected.

AIRPLANE AND GAS MASK FABRICS. The demand has been unusually active and prices unchanged, with the exception of Wamsutta No. 4, 38½ inch, that is now 42½ cents. A special grade of this fabric used for gas masks has been very active and is quoted at 44 cents.

MECHANICAL DUCKS. Hose and belting ducks continue to be insistently called for from both civilian and government sources. Prices are firm and unchanged, with a tendency to advance.

RAINCOAT FABRICS. Some large sales of 64 by 60 inch, olive-drab bombazines for government contracts have been reported. Manufacturers are confidently hoping to secure additional contracts for supplying the new slickers prescribed by the government. The demand has been good for small plaids printed in sport colors, as outside fabrics for women's coats and children's capes. These are surface prints on a 64 by 60 inch cloth and have the appearance of a high-priced woven fabric.

SHEETINGS, OSNABURGS, DRILLS. Government orders are responsible for the firm condition of these fabrics. Sheetings and Osnaburgs have been very active and prices for certain grades have advanced. Carriage cloth duck is very scarce and prices are firmly quoted, showing an upward revision since our last report. Drills have had an active demand, with the result that stocks are very low and prices are firm and unchanged.

TIRE FABRICS. The tire fabric market is still harassed by the uncertainty attending the new crops of Egyptian and Sea Island cotton. Standard 17¼-ounce Egyptian and Sea Island building fabrics have been greatly restricted by the prevailing conditions and are not quoted by some manufacturers. Present quotations are considered to be largely nominal. Standard 17¼-ounce peeler building fabrics have been in active demand, with an advancing price tendency.

NEW YORK QUOTATIONS.

AUGUST 27, 1917.

Prices subject to change without notice.

Airplane and Balloon Fabrics:

Wamsutta, S. A. I. L. No. 1, 40-inch.....yard	\$0.57½ @
No. 4, 38½-inch.....	.42½ @
Gas mask fabric.....	.44 @

Wool Stockinettes—52 inch:

A—14-ounce.....yard	1.75 @
B—14-ounce.....	2.25 @
C—14-ounce.....	2.50 @

Cotton Stockinettes—52-inch:

D—14-ounce.....yard	.85 @ .90
E—11½-ounce.....	.60 @ .65
F—14-ounce.....	.85 @ .90
G—8-ounce.....	.75 @ .80
H—11-ounce.....	.70 @ .85
I—9-ounce.....	.60 @ .65

Colors—white, black, blue, brown.

Kritatae Stockinette.....pound	1.60 @ 1.65
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Tire Fabrics:

17¼-ounce Sea Island, combed.....square yard	*1.50 @ 1.60
17¼-ounce Egyptian, combed.....	1.35 @ 1.40

17¼-ounce Egyptian, carded.....	1.32 @ 1.35
17¼-ounce Peelers, combed.....	1.05 @
17¼-ounce Peelers, carded.....	.82 @ 1.00

Sheeting:

40-inch 2.35-yard.....yard	.19 @
40-inch 2.50-yard.....	.18 @
40-inch 2.70-yard.....	.17½ @
40-inch 2.85-yard.....	.16½ @
40-inch 3.15-yard.....	.16 @

Osnaburgs:

40-inch 2.25-yard.....yard	.19½ @
40-inch 2.48-yard.....	.17½ @
37½-in. 2.42-yard.....	.17½ @

Mechanical Ducks:

Hose.....pound	.53 @
Belting.....	.52 @ .53

Carriage Cloth Duck:

38-inch 2.00-yard enameling duck.....yard	.26½ @
38-inch 1.74-yard.....	.30 @
72-inch 16.66-ounce.....	.55 @
72-inch 17.21-ounce.....	.60 @

Drills:

38-inch 2.00-yard.....yard	.25 @
40-inch 2.47-yard.....	.20 @
52-inch 1.90 yard.....	.26½ @
52-inch 1.95-yard.....	.26 @
60-inch 1.52-yard.....	.33 @

Imported Woollen Fabrics Specially Prepared for Rubberizing—Plain and Fancies:

63-in., 3¼ to 7¼ ounces.....yard	.60 @ 1.75
36-inch, 2¼ to 5 ounces.....	.40 @ .95

Imported Plaid Lining (Union and Cotton):

63-inch, 2 to 4 ounces.....yard	.50 @ 1.00
36-inch, 2 to 4 ounces.....	.42½ @ .75

*Nominal prices.

TIRE FABRICS

JENCKES SPINNING COMPANY

PAWTUCKET RHODE ISLAND

Washed Latex	.....	@ .80
Washed Indian Latex (Cott. 10)	.....	.27 1/4

Raincoat Cloth (Cotton):		
1/2 x 48 in. water repellent	.....	.17
1/2 x 48 in. water repellent	.....	.25
1/2 x 48 in. water repellent	.....	.30
1/2 x 48 in. water repellent	.....	.15
1/2 x 48 in. water repellent	.....	.13
1/2 x 48 in. water repellent	.....	.14 1/2
1/2 x 48 in. water repellent	.....	.19
1/2 x 48 in. water repellent	.....	.23 1/4

Burlaps:		
32-7 1/2 ounce	.....100 yards	10 @
40-7 1/2 ounce	.....	10 @
40-8 ounce	.....	10 @
40-10 ounce	.....	10 @
40-12 ounce	.....	10 @
45-7 1/2 ounce	.....	12.40 @
45-8 ounce	.....	15.15 @
45-9 1/2 ounce	.....	15.00 @
48-10 ounce	.....	15.00 @

* Nominal prices.

EGYPTIAN COTTON MOVEMENT.

To—	From August 1, 1916, to	1916-17.	1915-16.	1914-15.
Liverpool	214,726	17,555	207,234
Manchester	131,609	17,209	149,429
Total shipments to Great Britain	346,335	34,764	356,663
France	27,735	38,956	59,919
Spain	16,321	—	50,842
Italy	31,603	51,491	53,800
Switzerland	19,883	—	169,112
Russia	31,731	42,860	40,575
Greece	65	785	2,392
Total shipments to continent	141,343	136,864	262,921
United States	120,731	163,788	162,917
India	11,255	25,265	16,556
Japan	11,155	—	—
Total shipments to all parts	599,664	746,801	799,057
Total crop (interior gross weight), cantars*	4,726,518	6,473,726	—

*Cantar equals 98 pounds.

(Compiled by Messrs. Baring & Co., Liverpool)

SEA ISLAND CROP 1916-1917.

	Receipts 1916-1917.	Receipts 1915-1916.
Stock on hand, August 1, 1916—Savannah, 2,401; Charleston, 107	.....	.....
Received at Savannah (net)	2,508	2,382
Received at Charleston	47,499	38,216
Received at Jacksonville	3,495	6,211
Received at Norfolk	43,080	30,367
Received at interior points and shipped direct to southern mills	1,914	—
Total Available Supply	115,617	88,194
Less Total Exports	114,573	85,686
Stock, July 31, 1917—Savannah, 1,043; Charleston, 1,044	.....	.....
Crop grown according to final shiner's report	117,544	91,920

EXPORTS AND RESHIPMENTS, 1916-1917.

From	Great Britain	Continent	Northern Mills	Southern Mills	Canada	Savannah	Galveston	Burned	Totals
Savannah	1,296	173	40,974	6,514	26	365	125	114	49,222
Charleston	—	—	2,502	732	—	—	—	—	3,601
Jacksonville	—	—	4,080	—	—	—	—	—	43,080
Norfolk	—	—	1,914	—	—	—	—	—	1,914
Interior points	—	—	—	17,121	—	—	—	—	17,121
Less cotton counted twice	1,298	173	88,470	24,367	26	365	125	114	114,938
	1,298	173	88,470	24,367	26	—	125	114	114,573

COMPARATIVE STATEMENT OF EXPORTS FOR PAST SIX YEARS.

	1911-1912.	1912-1913.	1913-1914.	1914-1915.	1915-1916.	1916-1917.
Great Britain	13,685	10,914	11,749	1,922	1,667	1,298
Continent	6,615	5,161	4,833	1,991	1,000	173
Domestic, northern mills	92,679	29,451	67,636	60,879	60,822	88,496
Domestic, southern mills	9,029	10,492	14,427	15,409	21,697	24,367
Galveston	—	—	—	—	—	125
Burned	—	—	—	—	—	114
Total	122,008	56,018	98,645	80,201	85,246	114,573

COMPARATIVE STATEMENT OF CROP GROWN FOR PAST SIX YEARS.

	1911-1912.	1912-1913.	1913-1914.	1914-1915.	1915-1916.	1916-1917.
South Carolina	5,122	8,375	8,670	5,590	6,178	3,486
Georgia	118,190	65,266	68,820	76,008	85,742	114,058
Total	123,312	73,641	77,490	81,598	91,920	117,544

(Compiled by Messrs. Baring & Co., Savannah, Georgia)

THE MARKET FOR CHEMICALS AND COMPOUNDING INGREDIENTS.

Copyright 1917.

NEW YORK.

THE metal market has been characterized during the month by a generally dull and stagnant condition, wholly due to the uncertainties pending the government's price-fixing decision. The demand for lead has been practically nil and prices nominal. The government has purchased 8,000 tons at 8 cents, St. Louis, to cover its August requirements. If the government orders are sufficient in volume to absorb surplus production, the market will continue to be firm. Should the government use 8,000 tons monthly, about one-fourth of the yearly production would be thus required.

Trading in spelter has been confined to small lots for immediate requirements, the volume of business, however, being too small to establish market prices. The government has bought 11,500,000 pounds of spelter at prices reported to range from 8.75 to 9 cents. Antimony was dull, with the demand at about zero. Price changes have been small during the month, Japanese and Chinese grades being quoted 15 to 15.50 cents New York, duty paid. The aluminum market has been colorless and prices show no change. No. 1, virgin metal, 98 to 99 per cent pure, is nominally quoted 50 cents, New York.

Business in rubber chemicals during August was fairly active for this time of the year, when the demand is usually quiet. Contract deliveries have been regularly made and inquiries for future requirements show anticipation of good fall and winter prospects in the rubber trade. Toward the latter part of the month the midsummer influence was made apparent by the diminution of business, and the market became easier. The uncertainty and firmness in the base metal market were reflected in the lead and zinc products of all sorts, resulting in a strong market position for these materials. Manufacturers of chemicals and ingredients are carefully scanning their production costs and awaiting the government's decision on the raw material price question. Until this matter is definitely settled uncertainty will dominate the market for lead and zinc products used in rubber compounds.

ACETONE. Stocks are very scarce and the production is well sold up, due to an active demand from both foreign and domestic sources. Prices are nominal, ranging from 33 to 35 cents a pound.

ANILINE OIL. The call has been steady and the producers appear to be able to meet present requirements. Prices are quoted on a basis of 28 to 29 cents.

CARBON GAS BLACK. The production cost continues to be high and prices are firm. There are practically no spot stocks, and sellers are only able to secure sufficient supplies to cover contract deliveries.

CAUSTIC SODA. The demand has exceeded the supply and there is a pronounced scarcity of available stocks. Leading producers are out of the market, which is now controlled by second hands. Prices have advanced since last month to 9 and 9 1/4 cents a pound for 76-78 per cent caustic soda.

HEXAMETHYLENE TETRAMINE. This organic accelerator has advanced in price and is now quoted 80 cents a pound.

RECLAIMED RUBBER. This material has been in active demand, and consequently prices are firm and show a slight advance during the month. Standard shoe reclaim was quoted at 16 1/8 to 16 3/4 cents, and standard tire reclaim, 21 1/4 to 21 1/2 cents on August 27.

SULPHUR. Difficulties in shipping the raw material continue to restrict this market. Prices are firm and unchanged. The Export Council at Washington has discredited the report that an embargo has been placed on exports of sulphur to Canada.

TOLUOL. There are no supplies available as the government is taking over the entire production for making trinitrotoluol, one of the most valuable high explosives.

WHITING. Business has been good and the consumption of both whiting and chalk is far in excess of the supply. Prices are firm and unchanged.

ZINC OXIDE. Active demand for this material has been the feature of last month's chemical market. It is of interest to consumers to know that the time is approaching for a new schedule of prices for French process zinc oxide.

NEW YORK QUOTATIONS.

AUGUST 27, 1917

Subject to change without notice.

Accelerene	lb.	*\$2.62	a
Acetone (drums)	lb.	.33	@ .34
Acid, acetic, 28 per cent. (bbls.)	lb.	.05 1/4	@ .05 1/2
glacial, 99 per cent (carboys)	lb.	.33	a
creylic, 97-99 per cent, straw color	gal.	1.10	a
95 per cent, dark	gal.	1.00	@
muratic, 20 degrees	lb.	.01 1/4	a
nitric, 36 degrees	lb.	.06 3/4	@
sulphuric, 66 degrees	lb.	.01 3/4	@
Aldehyde ammonia (crystals)	lb.	1.00	@
Aluminum flake (carloads, bbls.)	ton	24.00	@
(carloads, sacks)	ton	22.00	@
Ammonium carbonate, powdered	lb.	1.11	a
lumps	lb.	1.01	a
Antimony, crimson, sulphuret of (casks)	lb.	.45	@ .48
crimson, "Magnetco"	lb.	.45	a
crimson, "Mephisto" (casks)	lb.	.50	@
golden, sulphuret of	lb.	.25	a
golden, "Magnetco"	lb.	.30	a
golden, "Mephisto" (casks)	lb.	.27	a
golden, sulphuret, States brand, 16-17 per cent.	lb.	.28	@
red sulphuret, States brand	lb.	.25	@
vermillion sulphuret	lb.	.60	@
Arsenic, red sulphide	lb.	.50	@
Asbestine (bags)	ton	21.50	@
Asbestos (bags)	ton	*35.00	@ 50.00
Barium, carbonate, precipitated	lb.	.04 1/2	@ .04 3/4
Barium sulphate, precipitated	lb.	.04	@
Barytes, pure white	ton	32.00	@ 33.00
off color	ton	22.00	@ 23.00
Basofo	ton	80.00	@
Benzol, pure	gal.	.50	@ .60
90 per cent.	gal.	.50	@ .60
Beta-Naphthol	lb.	.70	@ .90
Brown oxide of iron	lb.	.01 1/4	@ .02
sienna, raw and burnt	lb.	.05	@ .10
umber, raw and burnt	lb.	.04 1/2	@
ochre, domestic	lb.	.02	@ .03
imported	lb.	.04	@ .04 1/2
Bone ash	lb.	.10	a
black, powdered	lb.	.15	@
granular	lb.	.20	@
Cadmium tri-sulphate (f. o. b. London)	lb.	*2.68	@
sulphide, yellow	lb.	2.25	@
Cantella gum	lb.	.38	@
Carbon, bisulphide (drums)	lb.	.07	@
black (cases)	lb.	.27	@ .35
tetrachloride (drums)	lb.	.17	@ .18
Caustic soda, 76 per cent.	lb.	.09	@ .09 1/4
Chalk, precipitated, extra light	lb.	*.05	@ .05 1/2
precipitated, heavy	lb.	*.04	@ .04 1/2
China clay, domestic (powdered)	ton	20.00	@ 25.00
imported (powdered)	ton	45.00	@
Chrome, green	lb.	.40	@
yellow	lb.	.24	@
Cobalt blue	lb.	.35	@ .50
Cotton linters, clean mill run	lb.	.06	a
Excellerex	lb.	.85	@
Fossil flour	ton	60.00	@ 65.00
Gas black (cases)	lb.	.27	@ .35
Gilsonite	ton	40.00	@
Glue, high grade	lb.	.40	@ .60
medium	lb.	.30	@ .40
low grade	lb.	.25	@ .28
Glycerine, C. P. (drums)	lb.	.64	a
Graphite, flake (400 pound bbl.)	lb.	.15	@
amorphous	lb.	.06	@
Green oxide of chromium (casks)	lb.	.75	@
Ground glass FF. (bbls.)	lb.	.02 1/4	@
Hexamethylene Tetramine (powdered)	lb.	.80	@
Indian red, reduced grades	lb.	.05	@ .08
pure	lb.	.10	@
Infusorial earth, powdered	ton	60.00	@
bolted	ton	65.00	@
Iron oxide, red, reduced grades	lb.	.04	@ .10
red, pure, bright	lb.	.12	@ .16
red, excelsior	lb.	*.18	@
Ivory, black	lb.	.16	@ .30
Lampblack	lb.	.14	@ .20
Lead, red oxide of	lb.	.13	@
sublimed blue	lb.	.11	@
sublimed white	lb.	.11	@ .11 1/2
white, basic carbonate	lb.	.11 1/2	@
white, basic sulphate	lb.	.11	@
black hyposulphite (Black Hypo)	lb.	*.50	@
Lime, flour	lb.	.01 1/4	@ .01 1/2
Litharge, domestic	lb.	.11 1/4	@ .12 1/2
English	lb.	.13 1/4	@ .14
sublimed	lb.	.13	@
Lithopone, imported	lb.	*.13	@ .14
domestic	lb.	.06 1/2	@
Beckton white (carloads)	lb.	*.06 1/2	@
Magnesium, carbonate, 150 mesh	lb.	.02	@
calcined, heavy, Thistle Brand	lb.	.12	@
light	lb.	.70	@ .75
Magnesium, oxide, 120 mesh	lb.	.04	@
Magnesite, calcined, powdered	ton	40.00	@ 50.00
Mica, powdered	lb.	.03 1/2	@ .05
Mineral rubber, "M. R. N."	ton	100.00	@
"Gen. Co." (carloads)	ton	37.00	@
"Pioneer"	ton	45.00	@
"Richmond Brand"	lb.	.03	@
"No. 64 Brand"	lb.	40.00	@
"Refined Plateite"	lb.	*.05	@
Naphtha, stove gasoline (steel bbls.)	gal.	.24	@
66@68 degrees	gal.	.29	@
68@70 degrees (steel bbls.)	gal.	.30	@
V. M. & P. (steel bbls.)	gal.	.23	@
Oil, aniline	lb.	.28	a
corn, refined Ats. (carloads)	ton	16.21	@ 29
linseed (bbl.)	gal.	1.25	@
palm	lb.	.16	@ .17 1/2
paraffin	gal.	.27	@ .28
pine, steam distilled	gal.	.27	@
pine tar	gal.	.28	@
rapeseed, blown	gal.	1.45	@ 1.50
rosin	gal.	.35	@
tar (cases)	gal.	.27	@ .34
soluble aniline colors, yellow, orange	lb.	2.50	@
Orange mineral, domestic	lb.	.15	@
Paragol, soft and medium (carloads)	cwt.	11.95	@
Petrolatum	lb.	11.45	@
Petroleum grease	lb.	.05 1/2	@
Pine tar retort	lb.	.04 1/2	@ .04 3/4
kiln	bbl.	15.00	@
Pitch, Burgundy	gal.	2.90	@
coal tar	lb.	.04	@
pine tar	lb.	.01	@
Plaster of paris	bbl.	.03 1/4	@
Prussian blue	lb.	2.00	@ 3.00
Pumice stone, powdered (bbls.)	lb.	.80	@ 1.50
Reclaimed rubber, Standard shoe reclaim	lb.	.03 1/2	@
Standard tire reclaim	lb.	.16 1/8	@ .16 1/2
Resin, Pontianak, refined	lb.	.21 1/4	@ .21 1/2
granulated	lb.	.28	@
fused	lb.	.25	@
Rosin, K, (280 lbs.)	bbl.	.65	@
Rotten stone, powdered	lb.	.02 1/2	@ .04
Rubber black	lb.	.06	@
Rubber substitute, black	lb.	.09 1/2	@ .14
white	lb.	.14	@ .20
brown	lb.	.15	@ .20
Rubhide	lb.	.38	@
Shellac, fine orange	lb.	.62	@ .65
Silex (silica)	ton	20.00	@ 36.00
Soapstone, powdered	ton	16.50	@ 20.00
Starch, powdered corn (carload, bbls.)	cwt.	6.33	@
(carload, bags)	cwt.	6.20	@
Sulphur chloride (drums)	lb.	.08 1/2	@ .09 1/2
Sulphur, flour, velvet brand (carloads)	cwt.	3.95	@
pure soft	cwt.	3.95	@ 4.50
Talc, American	ton	16.50	@ 20.00
French	ton	47.50	@ 48.00
Tar, coal	bbl.	4.25	@
Toluol, pure	gal.	1.75	@ 2.25
Tripoli earth, powdered	ton	60.00	@
bolted	ton	65.00	@
Turpentine, pure gum spirits	gal.	.43	@
wood	gal.	.38	@
Venice	lb.	.08	@
Tyre-lith	ton	100.00	@
Ultramarine blue	lb.	.22	@ .50
Vermilion	lb.	.65	@ .80
Chinese	lb.	2.50	@
English	lb.	1.90	@ 2.00
Wax, beeswax, white	lb.	.68 1/2	@ .70
ceresin, white	lb.	.20	@ .24
carnauba	lb.	.41	@ .55
czokerite, black	lb.	.48	@ .60
green	lb.	.68	@ .70
montan	lb.	.32	@ .33
paraffin, refined 118/120 m. p. (cases)	lb.	.09 1/2	@
123/125 m. p. (cases)	lb.	.10	@
128/130 m. p. (cases)	lb.	.11	@
133/136 m. p. (cases)	lb.	.12 1/2	@
Whiting, Alba	cwt.	1.00	@ 1.25
commercial	cwt.	1.25	@
gliders	cwt.	1.35	@
Paris, white, American	cwt.	1.50	@
English cliffstone	cwt.	1.75	@ 2.00
Wood pulp XXX	ton	*35.00	@
Yellow ochre	lb.	.04	@
India rubber	lb.	1.50	@
Zinc oxide, American process, horsehead brand	lb.	.10 1/2	@
"XX red"	lb.	.11	@
"special"	lb.	.15 1/2	@
French process, red seal	lb.	.15 1/2	@
green seal	lb.	.15 1/2	@
white seal	lb.	.16 1/2	@
Zinc sulphide, pure	lb.		None

* Nominal prices.



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